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the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 84

CRUDE-OIL STOCKS 237,137,000 bbl. as of Feb. 26—down 374,000. One year ago 235,217,000 bbl.

GASOLINE STOCKS 85,248,000 bbl. as of Feb. 26—up 1,317,000. One year ago 92,772,000 bbl.

RESIDUAL FUEL-OIL STOCKS 51,387,000 bbl. as of Feb. 26—down 1,578,000. One year ago 70,516,000.

GAS OIL AND DISTILLATE 33,766,000 as of Feb. 26—up 57,000. One year ago 35,691,000.

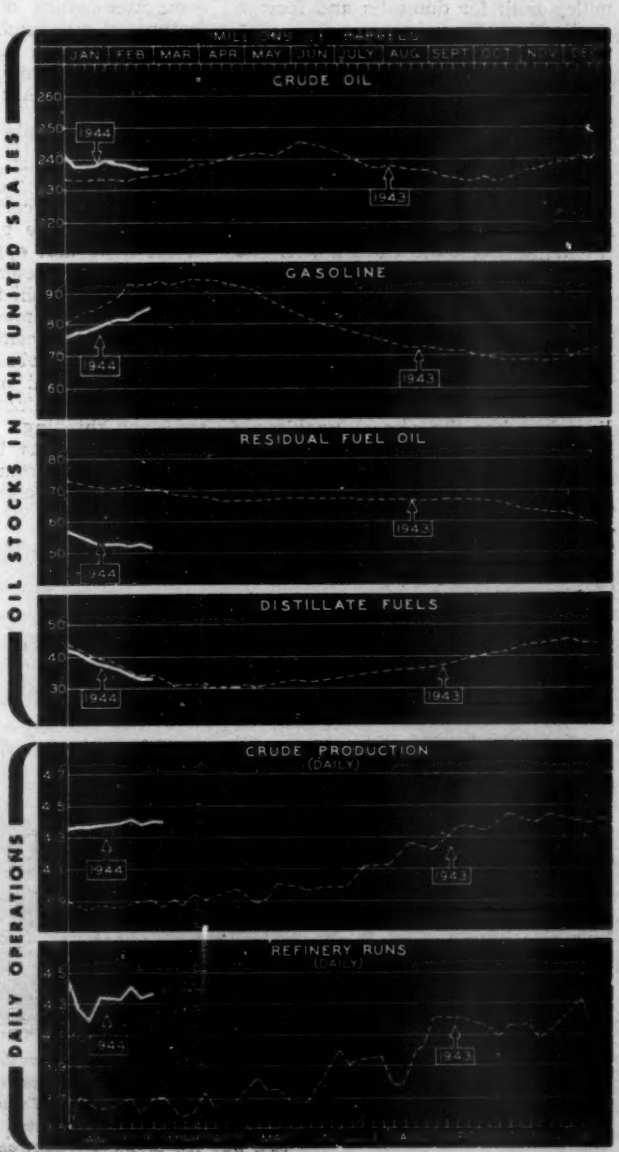
CRUDE-OIL PRODUCTION 4,399,800 bbl. daily average—down 29,415 bbl. One year ago 3,906,370.

REFINERY RUNS 4,377,000 bbl. daily week ended Feb. 26—up 37,000 bbl. One year ago 3,683,000.

DOMESTIC producers who are expressing concern as to the effect that the proposed rapid expansion in Arabian, Kuwait, and other Middle Eastern oil operations will have on their operations can find partial answers to their questions through a study of prewar markets coupled with the available information on output at this time. Some analysts are using 1939 figures on petroleum demands in the Eastern Hemisphere as indicative of the probable requirements in that area in the period immediately following peace. Data for that year show that the overall demand for petroleum products in the Eastern Hemisphere totaled approximately 1,700,000 bbl. daily. Assuming a quick return to a prewar production of 175,000 bbl. daily for the East Indies, the Eastern Hemisphere's output, should the war end soon, would be around 1,300,000 bbl. daily.

THUS there would be a deficit of 400,000 bbl. daily, which would have to be supplied from the Western Hemisphere. In the prewar period practically all of the petroleum shortage of the Eastern Hemisphere was supplied by exports from this country, Mexico, Trinidad, Venezuela, Colombia, and Netherlands West Indies. The deficiency then was greater than it would be now under the assumptions just outlined. This would mean that the Arabian-Kuwait pipe line as now projected to the eastern Mediterranean would absorb a large part of the deficit of the Eastern Hemisphere should it be able to deliver 250,000 to 300,000 bbl. daily of crude oil in the postwar period. In that connection a production of 300,000 bbl. daily would be small in relation to the proven reserves of Kuwait and Arabia.

THERE is the further fact that Iraq, Iran and probably the U.S.S.R. have large new reserves which will be drawn upon as soon as transportation is provided in the postwar period. The usual conclusion of economists is that the Eastern Hemisphere will be largely independent of the Western Hemisphere in regard to petroleum supplies within a short period after the war ends, regardless of the methods used in expanding operations in that area. Looking to a still later period, these studies are also emphasizing the large potential petroleum markets in the Eastern Hemisphere. Reports at this time show that the Eastern Hemisphere, exclusive of war demands, with 70 per cent of the world's land area and 88 per cent of its population, accounts for only 30 per cent of the petroleum consumption.



Opposition to Arabian Line May Hasten Formation of Oil Policy

by **Henry D. Ralph**

WASHINGTON, D. C.—The storm of opposition which has risen against the government-owned oil pipe line across Saudi Arabia, a project sponsored by Secretary of the Interior Harold L. Ickes in his capacity as president of the Petroleum Reserve Corp., promises to hasten the formulation of a definite national-oil policy both for domestic and foreign application.

There is a strong probability that the project may be deferred pending formulation of a policy, which could mean that it might never be carried out as now planned.

Certainly PRC's Arabian adventure is pointing up lack of policy and the need for a full understanding of all facts and problems involved in relations between the Government and the oil industry at home and abroad, and the proposed pipe line will be the first object of investigation when the special Senate committee on national-oil policy begins its studies.

Developments during the week make it plain that the Arabian pipeline deal has the almost unanimous and outspoken opposition of the oil industry and that it has cast suspicion on many other phases of the administration's petroleum activities.

Outstanding was the attack by the Petroleum Industry War Council, which adopted a resolution denouncing the Arabian project and reiterating a demand that PRC be dissolved.

The council also adopted a preliminary report of its national oil policy committee which outlined the basic features of government action and attitude and which ruled out all such government operation of oil industry facilities as the Arabia project.

Time Schedule Interrupted

There are indications that PRC planned to have completed all arrangements for construction of the Arabian pipe line prior to this time in the hope that opposition could be forestalled by presenting critics with a thing accomplished. However, there have been a number of hitches in completing the contracts and other details and new obstacles are arising, not only political but such physical problems as obtaining allocations for steel and shipping.

The Senate has been delayed by other business from completing the creation of a special committe to investigate and recommend a foreign and domestic-oil policy, but the committee is expected to start proceedings shortly. Representatives from four standing committees have been selected tentatively, and a ninth member will be appointed from the Senate at large. Those tentatively named are: for the Interstate Commerce committee, Johnson of Colorado and Moore of Oklahoma; for the Commerce committee, Maloney of Connecticut and Brewster of Maine; for the Public Lands committee, O'Mahoney of Wyoming and Gurney of South Dakota; for the Foreign Relations committee, Connally of Texas and Davis of Pennsylvania.

First attack on the Arabian pipe line came March 1 from James A. Moffett, who announced in New York that he had resigned as chairman of the California Texas Oil Co., Ltd., and the Bahrein Petroleum Co., Ltd., because he did not approve of the deal which PRC proposed to enter with American oil companies operating in the Persian Gulf area. He issued a statement severely criticizing the entire project.

On the same day the PIWC adopted a resolution opposing the project and

George A. Hill, Jr., president of Houston Oil Co. of Texas, and author of the PIWC resolution opposing the Arabian pipe-line project, explaining the reasons for the industry's stand at a Washington press conference. Supporting Hill's presentation are W. R. Boyd, Jr., chairman of the council; John A. Brown, chairman of the council's oil-policy committee; Russell B. Brown, assistant to the PIWC chairman and general counsel of the Independent Petroleum Association of America; Ralph T. Zook, president of the Independent association, and Joe L. Dwyer, assistant to the chairman of PIWC

asking liquidation of PRC.

The following day Ickes held a press conference in which he answered Moffett's charges by calling him a "playboy", criticizing his record as Federal Housing Administrator several years ago, and attacking him on various personal grounds. He admitted, however, that opposition from PIWC was an entirely different matter, and insisted that there is no conflict between the council and himself regarding domestic matters which are in the jurisdiction of the Petroleum Administration for War. The council's opposition to PRC he described as an honest difference of opinion, and he declared that he did not agree with the view of the oil men expressed in the PIWC resolution. Ickes defended the pipe line both as a war and a postwar project, said arrangements were proceeding for construction, and declared his intention to go ahead with it unless stopped. In answer to the charge that this would put the Government in the oil business he said that the line is merely a transportation facility and that construction of the Panama Canal did not put the Government in the shipping business.

On the same day a press conference was held by the national oil policy committee of PIWC to answer questions about the PRC resolution and the preliminary draft of an oil-policy platform. Speaking for the committee, Chairman John A. Brown reviewed the attitude of the oil industry as expressed in the resolution and described the history of PRC. He told the press that the industry opposed everything which the Government might do under the terms of PRC's charter, and revealed that the resolution was adopted in PIWC by 55 affirmative votes with four members not voting, these being representatives of the Shell Oil Co., Inc., Gulf Oil Corp., The Texas Co., and Standard Oil Co. of California.

George Hill, Jr., who drafted the resolution, added that the pipe-line project looks like concrete evidence of an intention of the Government to invade private oil business, and he looked forward to an investigation of the entire PRC.

White House Approval

President Roosevelt discussed the Arabian project at his press conference March 3, giving it inferential support. He said that he is thinking of the country's oil supplies not just 5 years from now but 50 years ahead. Asked about details, the president said he assumed the Senate is fully informed.

One of the first documents to be placed before the Senate committee when its investigation gets under way will be a booklet on foreign-oil policy now being printed by PIWC and which will also be given wide distribution to the public. This will contain the PIWC resolution on PRC and the Arabian project, the preliminary report of the PIWC oil-policy committee, and a special report on foreign-oil policy prepared by Hill.

PIWC's resolution opposing the Arabian pipe line and similar activity of PRC is essentially a condensed summary of an exhaustive study of the issues made by George A. Hill, Jr. His study which attacks the Arabian proposal as a violation of long established relations between industry and government, is inimical to the Atlantic Charter, and as a fascist approach to the problem is to be issued in booklet form with nation-wide distribution.

This special report is a source book of information relating to the foreign policy of the United States as it bears on oil, including a discussion of the Atlantic Charter and all recent official statements on foreign policy and published statements by government officials bearing on foreign oil and particularly on the PRC.

The PIWC resolution asserted that:

"The proposed contract, providing for the U. S. Government undertaking to own and maintain an international pipe-line system in the Middle East, is against the interest of the people of the United States and all the American oil industry; that the final definitive contract covering such contract should not be consummated, and that the Petroleum Reserves Corp. should be dissolved."

In a statement preceding the resolution Brown declared:

"At the February 2, 1944, meeting of this council, a resolution was adopted advising against our government entering the oil business and recommending that the Petroleum Reserves Corp. be dissolved as unnecessary for the war effort. Within 2 days after that meeting, announcement was made officially that the Petroleum Reserves Corp. had signed, with certain oil companies, a document called 'Principles of Agreement,' providing for the U. S. Government to construct, own and maintain a pipe-line system about 1,000 miles long between the Persian Gulf and the eastern end of the Mediterranean Sea.

"A letter by the secretary of the Navy, addressed to a Senate committee, within the past few days, indicates an intention to find additional projects for commitments by our Government not connected with this war, commitments and involvements of this nation in foreign countries, through the medium of the Petroleum Reserves Corp., without any relation between such projects and the carrying on of this war."

Foremost among manifold objections raised by PIWC to the proposed Middle East venture of PRC was:

"The contract assumes, if it does not commit the United States and its nationals to, marketing a large additional amount of oil to be produced from the Persian Gulf fields in competition with other world sources of supply. It will have a serious effect on exports from South America and the United States, and may create ill feeling with our South American neighbors. If such a result arose from private company action these countries could not feel aggrieved, but when their economics are adversely affected by direct and unnecessary action on the part of the U. S. Government itself, they will undoubtedly feel that they have a real grievance.

"Direct participation by the Government of the United States in a pipe-line system traversing the territory of three foreign nations can easily lead to international misunderstandings and pave the way to a future war through the involvement of our national honor. Certainly such a project with all of its implications should be submitted for the approval of Congress with ample time for thoughtful consideration."

National Benefits Questioned

Any advantages to the United States and its people from construction of the Middle East pipe line could all be obtained "through vigorous and sympathetic diplomatic support on the part of our State Department under established principles of international law, of the rights of our national operating in foreign fields," PIWC contended.

PIWC pointed out that the Persian Gulf to Mediterranean Sea pipe line would not result in any new oil or oil reserves for the United States or its citizens and would not make accessible any oil not already accessible.

"It is not a project related to winning this war," PIWC explained. "The oil in the Persian Gulf is already on the seacoast and can be shipped by tank steamer anywhere in the world.

"It is not necessary for the U. S. Government to build this pipe line. If it is justified from a commercial standpoint the companies should, and are able to, build it; if not commercial, it should not be built.

"Contrary to some publicity," PIWC's resolution said, "the pipe-line project will not result in the acquisition of any new oil or oil reserves for the United States or its citizens, nor does it make accessible any oil not already accessible. It is not a project related to winning this war. The oil in the Persian Gulf is already on the seacoast and can be shipped by tank steamer anywhere in the world. All that the pipe line does is to reduce the cost of transportation of the oil to the Eastern Mediterranean by an amount estimated at 15 or perhaps 20 cents a barrel, equal to less than ½ cent per gallon. It is estimated the cost of the project will approximate $150,000,000."

Mid-Continent Refiners' Crude Supply Critical; Sour Oils No Solution

by Arch L. Foster

GRAVE doubts persist among a majority of Mid-Continent refiners that the imminent completion of additional pipe-line capacity from West Texas will afford relief for the District 2 crude-oil shortage.

Current supplies of crude oil available to District 2 refiners are more than 200,000 bbl. per day below the effective operating capacity. Government assumption of the difference between tank-car freight rates and pipeline tariffs on rail movement of Permian basin oil to District 2 refineries, a program in effect for about 2 months, failed to stimulate the use of sour crudes in Mid-Continent refineries. Compensation payments for high-cost shipments of crude oil may be extended to additional producing areas by Defense Supplies Corp., possibly for promotion of rail movement from the Rocky Mountain district.

At least two practical deterrents stand between District 2 refiners and potential sources of additional crude oil: (1) West Texas Permian basin crudes are less desirable in District 2 because of their sulfur content; (2) there are insufficient tank cars to meet overland shipments to the East and Pacific coasts, indicating that rail movement of District 4 crude oil to Mid-Continent and Middle West refineries would be virtually impossible until shipping facilities are freed from current service.

Utilization of sour crude is no direct solution to the District 2 refinery supply problem. Most of these plants are not equipped to handle sour oils without installing alloy tubes, exchangers, headers, and vapor lines. These refiners consider, according to interview statements, that the blending of sour crudes with their partial supply of sweet oil will confuse product specifications. Production of kerosene from sour crudes is a practical impossibility for most District 2 refiners, plant operators say. Meeting standard specifications, and those of the individual refiners for their own output, with high-sulfur crude means heavy acid treating and careful fractionation to limits which are not included in present specifications. Most of the refiners do not have equipment necessary to undertake acid treating of any sort. Therefore the introduction of sour crude even in small amounts will upset all carefully worked-out methods for making the line of products on which District 2 refinery business is based—gasoline, kerosene, furnace oils, diesel and tractor fuels, heavy fuels, and asphalt in a few instances.

Specialty Production Curbed

One refiner observed that he must completely drop out of the market for specialties, solvents, special fractions, etc., a field which he has nurtured carefully over a long period of years, if he is forced to use sour crude. Economics precludes his use of these crudes.

Furthermore, even though allocation of additional sour crude for these purposes has been made and even though the additional production from Slaughter and other West Texas fields can be made available, tank cars to transport it to its several destinations are not available. The average tank-car capacity is 210 bbl. Shipment of 60,000 bbl. per day would require nearly 300 tank cars per day. With a week as the probable minimum turnaround, 2,100 cars would be needed to establish continuous deliveries. Thus, even if Mid-Continent refiners could handle sour oil, it could not be obtained in sufficient quantities to satisfy demands.

The 16-in. line being built by Stanolind Pipe Line Co. from Slaughter field in West Texas to Drumright, Okla., is nearing completion with work proceeding ahead of schedule. The line will be completed and ready to operate by April 1 barring unforeseen delays. Preliminary operation may be started earlier. Upon the completion of this line the sour crude will be available, theoretically, for Mid-Continent refiners at Cushing, Okla. However, unless some of the lines from Kansas to Cushing are cleared and reversed to carry the sour crude on north to other Oklahoma and Kansas plants, the shortage of tank cars will preclude its movement outside the Cushing area. Much of the sour crude will be transferred at Drumright to Stanolind's eastern lines to supply other plants in the Midwest.

Sour Crude May Release Local Oil

If 60,000 bbl. per day of sour crude are sent east from West Texas, this may release indeterminate quantities of Kansas and Oklahoma crude to the independent Mid-Continent refiners. It is assumed by some observers that the new supply from West Texas is needed to augment the crude available from other sources at Wood River, Ill., and other refining centers in order to sustain manufacturing rates on war products. If this is the case, the sour-crude line offers no surcease to the local crude-starved plants and the supply problem must be solved in other ways. However, it seems now that Mid-Continent refiners must look to nearby production to supply their requirements. Whether that can be done is not at all certain. If special allocations as recommended from month to month by the District 2 PAW officials become effective the supply problem may be partially solved.

Meanwhile, Mid-Continent refiners currently are less concerned than previously about the necessity to install catalytic crackers in order to survive in the immediate postwar era. Recent announcements regarding probable postwar octane-number requirements have been conservative in fact and tone. Octane number stampedes are not indicated for the immediate postwar period, authorities say, both from the refining and automotive industries.

Investigations are being made of different catalytic processes in some cases and much attention is given to the economic and technological possibilities, especially as to installation costs and possible yields.

Technically, refiners seem to be more interested than ever in new processes but they feel that the adoption of ultraexpensive units will not be forced on them under uneconomic conditions, and that further developments can be expected to change their picture radically before installation becomes imperative. The cracking unit which costs hundreds of thousands, instead of millions of dollars, is what they are looking and hoping for, but such units are not certain as yet.

Acme Photo

Here's added proof, if any were needed, that 100-octane gasoline is one of the most essential instruments of war. The figure 100 stamped on the end of each drum in this fuel dump in the Azores designates the contents as fighting-grade gasoline

THIS WEEK

FOREIGN—Fifty-five members of PIWC voted for resolution blasting PRC in general, Arabian pipe-line project in particular. . . . ¶Interim report by council's national-policy committee reaffirms stand for private development, warns of probable sequence of such meager inroads by government. . . . ¶Wide divergence between PRC's Arabian project and previous policies analyzed in exhaustive study, which is to be issued in booklet form, given nation-wide distribution. . . . ¶Petroleum Administrator Ickes unconvinced, remains firm in conviction that national benefits will accrue. . . . compares pipe line to Panama Canal, argues that it didn't put government in shipping. . . . ¶Representatives of three Middle East producers, PRC officials scheduled to sign implementing agreement in New York this week.

PRICES—Elements in industry splitting on stripper-subsidy issue, playing into OPA hands. . . . ¶Fractional leaders play for delay, seeking to keep OPA under political pressure until bill renewing and extending agency's life comes before Congress. . . . ¶Numerous stripper operators ready to accept preliminary proposal of 30 per cent premium for 5-bbl. wells, 20 per cent on 6 bbl. and 10 per cent on 7-bbl. producers. . . .

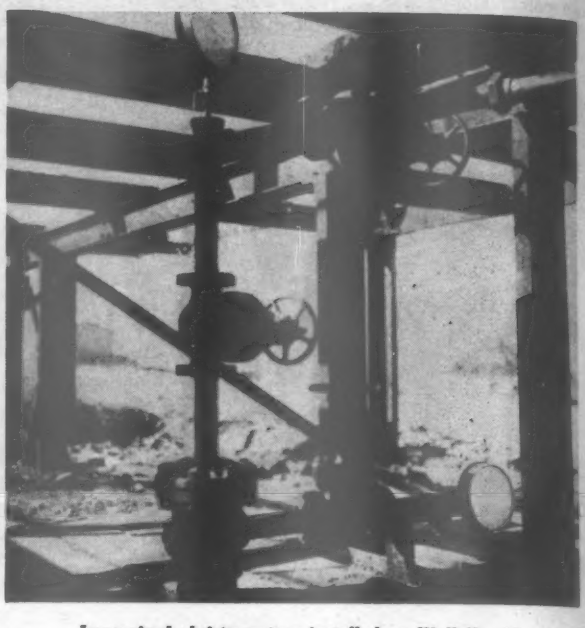
EQUIPMENT—Liberalization of restrictions sifting rapidly through to manufacturers and consumers. . . . Production of pumping units up another 22 per cent. . . . Alloys available for formation-contact parts of rock bits, manufacturers may now adopt new designs, if desirable. . . . Engine distributors' stocks of maintenance and repair parts being replenished. . . . ¶OPA considering pricing relief for oil-equipment manufacturers in current and postwar period. . . . First meeting reveals how certain untenable positions can be avoided. . . .

REFINING—Rise to 780,000 bbl. daily in East Coast runs to stills forecast by PIWC economic committee. . . . Increase made possible by 50,000 bbl. per day increase in coastwise tanker capacity. . . . ¶Numerous 100-octane plants delayed in completion by inferior exchanger tubes, now more freely available in superior forms. . . . ¶District 2 plant operators tell why they cannot use sour crude, continue efforts to win agreement on compensatory freight payments from sources other than District 3. . . .

DRILLING—Nearly 1,400 rotary rigs in operation, 370 more than the 1943 average. . . . ¶Decreases in drilling efficiency prevent corresponding rise in well completions. . . . ¶Manpower shortages becoming more critical. . . . ¶Automotive engine parts, essential to transportation of field equipment, becoming serious problem. . . . ¶Average completion rate of 353 wells per week must be increased, if 24,000 total for year is realized. . . .

TRANSPORTATION—Regular deliveries of fuel oil through WEP 20-in. products line will be established within a few days. . . . ¶Contract let for looping another system from West Texas, boosting capacity 70,000 to 80 000 bbl. daily. . . . ¶PAW discounts Mexican pipe-line rumors, doubts that Army or Navy would institute independent project. . . . ¶Tank-car deliveries to East Coast rising, expected to average 720,000 bbl. daily this month. . . . ¶Products pipe lines increase traffic 64 per cent in 1943, currently handling nearly 35 per cent of all gasoline manufactured. . . .

Well No. 19 with 5 9/16-in. drill pipe in foreground



Improvised christmas tree installed on Well No. 16

China's Production of 3,000 Bbl. Daily Starts Nation Toward Self-Sufficiency

by John P. O'Donnell

W. C. Field, driller; F. V. Rhyner, driller, and M. H. Bush, adviser to Kansu Petroleum Administration

NEW YORK. — China is one major country of the world which will probably become self-sufficient from an oil standpoint as a result of developments undertaken as a wartime measure. After Japan blockaded China's Pacific ports and the Burma Road was closed, it became imperative for the Chinese to develop a source of petroleum within their own borders. Consequently, prospects that had been recognized but never tested were explored.

This led to the development of the Kansu field, 900 air-line miles northwest of Chungking, where production of 3,000 bbl. per day has been attained. This development has been carried on by American oil men under the direction of M. H. Bush, who was formerly with Standard Oil Co. of California and Iraq Petroleum Co. and who has operated in many parts of the world. Bush is now serving as adviser to the Kansu Petroleum Administration. Two American drillers, F. V. Rhyner and W. C. Field, are working with Bush at Kansu.

While current Chinese production is small in relation to that of major producing countries, it is highly important locally and is significant. In 1940, crude-oil production in China was officially reported at 439,142 gal., equivalent to 30 bbl. per day. Thus, in approximately 3 years, the rate has been increased 100 times. Furthermore, it proves production possibilities exist in the vast area stretching from Sczechwan Province, in which Chungking is located, to Sinkiang Province, bordering on Asiatic Russia.

Oil seepages occur along a 2,000-mile arc from Kashgar in extreme western Sinkiang through Kansu into Shensi and Sczechwan provinces. This arc follows the Trien Mountains in Sinkiang and the Nan range in southern Kansu, paralleling depressions which once were probably inland seas. These favorable factors are further enhanced by a cursory examination of surface geology which indicated structural conditions favorable to the accumulation of oil deposits.

Production has been developed at

two points along this arc, at Kansu and in Sinkiang, where the Russians had drilled prior to withdrawing from that province in January 1943. In addition, the Russians have production east and south of Samarkand in Turkistan in what could be an extension of the Sczechwan-Sinkiang arc. The Turkistan fields are 400 miles southwest of Kashgar. The Peshawar fields in northwestern India are about 450 miles south of Kashgar.

Factors Retarding Development

Two factors have combined to prevent earlier and more intensive development of this area, the difficulty of acquiring oil-well equipment and of getting the oil out. While Kansu is 900 miles northwest of Chungking by air, it is 2,500 km. (1,550 miles) by road. Chungking is an additional 750 air miles from the nearest coastal ports through which the equipment would be imported under normal circumstances.

If production of sizable volume was developed, the problem of getting it to market would remain. Prior to the war, consumption of petroleum products in China was less than 20,000 bbl. per day. Since the Kansu area is so far removed from centers of consumption, construction of a pipe line of the required length to handle such a small volume would have been uneconomic. It is possible that when production is further developed, it will be distributed via the network of rivers by which much of more populous eastern China may be reached. A goal of 10,000 bbl. per day has been set for Kansu.

Transportation is the principal problem now facing the Chinese in Kansu. The gasoline which is produced at the refinery in that province ends up its journey to Chungking by floating down the Chialing River on rafts made of inflated goatskins. The refinery is equipped with crude batch-type stills and involves a simple topping operation which produces 18 to 19 per cent gasoline. The rest of the crude is lost since there is no additional processing equipment, no storage and no means of economically transporting it to market.

Construction of a modern refinery at Kansu is planned but it is improbable that it will be undertaken before end of the war. This refinery will probably include a Dubbs thermal-cracking unit and possibly a catalytic-cracking unit. Some consideration has been given to the erection of a T.C.C. unit when conditions permit.

It was reported last year that 14 wells have been drilled in Kansu. Actually the production is obtained from six wells producing from depths of 1,300 to 1,400 ft., with an average production of 500 bbl. per day. The first seven wells, drilled with cable tools, hit production in small volume from very shallow depths ranging from 200 to 550 ft. The deeper production was drilled with diesel-powered rigs.

Reliance on American Equipment

Drilling equipment on hand now includes six rotary rigs, four American, and two units obtained from Germany before the war. The latter are slow and obsolete so that full reliance is placed on the American equipment. The operations are handicapped by lack of equipment and inability to obtain replacements. Since everything imported into China must be flown in, only the most critical material and that which can be carried by plane is available.

Well No. 6 reflected in crude pit

The Kansu field is on the edge of the Gobi Desert, 8,000 ft. above sea level. There is practically no vegetation in that area, so that food as well as equipment must be trucked. Since supplies of gasoline are limited and critical, such shipments are infrequent. Conditions have required considerable improvisation on the part of the drillers, evidence of which may be seen in some of the accompanying pictures, particularly those showing the control hookup on Well 16 and the derrick substructure on Well 19.

Bush is now in the United States on behalf of the Kansu Petroleum Administration. He expects to return to China about April 1. Also in this country at present is Y. C. Tung, who was sent here by KPA to learn American drilling and production practices.

The proven superiority of American equipment, the presence of American oil men and the strongly pro-American attitude of the Chinese people have provided this country with a strong opening wedge in an area which may become a producing region of some consequence. However supply companies will face their usual intense competition from other countries. For example, German equipment was available before the war on a 20-year payment basis. The remoteness from consuming centers detracts from its value as an area of exploitation by American or other oil companies. It is possible that the predicted development of the country itself will make it a consumer of importance and add to the value of domestic production.

Well No. 16, showing flow line with flow ditch

OPA Considers Reconversion Pricing Problems for Oil-Field Equipment

NEW YORK. — Efforts to solve the price problem which threatens to penalize the petroleum-equipment industry during closing phases of the war and in the postwar-adjustment period were launched here February 26 at a meeting called by the Office of Price Administration.

Conversion of manufacturing operations from war contracts to commercial lines, a transition which is being hastened in the petroleum-equipment field in order to meet rising demands for crude oil and products, brings price problems to a critical stage. In many cases the prewar prices to which manufacturers of drilling, producing and refining equipment have been held since October 1941 will prove inadequate under current manufacturing costs.

"We intend," declared T. P. Sanders, OPA representative who presided at the New York meeting, "that this will be the first of a series of steps that will make it possible for us to assure your industry that price control will not place you in an untenable position during the period of industrial adjustment which we are now entering." Sanders is oil-industry specialist in the Construction and Extraction Equipment Section, Machinery Branch of OPA. The division is headed by Walter Shoemaker, who was also present at the conference.

In replying to a question asked by the chairman, the manufacturers present generally agreed that the equipment they would be selling after completing their war contracts would be quite different from their prewar lines. Many improvements are being planned, it was learned, and many new items will be offered. The chairman pointed out that specification changes resulting from improvements would serve in many cases to alleviate the price situation. As an example he cited the case of an oil-well packer which was priced in 1938, the price established at that time remaining in effect through the October 1, 1941, freeze date. When the packer was improved in 1943 the maximum price was recalculated under the provisions of Maximum Price Regulation 136. This regulation provides that the improved product can be priced on the basis of October 1, 1941, labor and material rates. Since the manufacturer's labor rates had increased between 1938 and October 1941, his recalculation yielded a more favorable selling price. In other words, the change in price was sufficient to compensate not only for the cost of improvement but also for the increase in wages that the manufacturer had initiated between 1938 and October 1941. The OPA representative cautioned that recalculation on this basis could only be permitted in the case of a significant specification revision, and that the price change could not be made without OPA approval.

Manufacturers were advised to keep cost records in good order, particularly with regard to the separation of war contracts from standard lines. Accurate records, they were told, would make it possible for OPA to act more quickly in providing necessary price relief in the event that termination of their war work should leave them dependent upon their standard lines of manufactured products.

How Advances Are Judged

In order to stimulate discussion, the OPA representatives outlined for the first time the general standards under which petitions for price increases are judged. The over-all profit status of the petitioning firm is considered as well as the margin of profit or loss on the products for which the price increase is sought. If the firm's profit status is considerably above its profits for the 1936-39 base period, then only a sufficient increase can be granted on individual items or lines to cover manufacturing costs. (Manufacturing costs in this case are defined as total costs less administrative and selling expense.) If the firm's profits are moderately above base-period profits, then the firm can be granted an increase sufficient to cover total costs on the individual item or line. If the firm's profits are equal to, or below base-period profits an increase can be granted on the individual item or line to cover total costs plus the margin of profit realized during the base period.

Certain qualifications to the general rule were mentioned which tend to liberalize the standards in some cases. But no firm can make a price increase without approval of the OPA, and in order to obtain approval it is first necessary to show an actual loss of profit. Thus, if the present policy were to remain in effect, the firm which completed its war contracts, and suddenly became entirely dependent upon its normal peacetime line of goods, would experience delay in obtaining necessary price relief. Since past profits would probably be favorable as a result of war work, the firm would find it necessary to operate at its prewar-price schedule for a sufficient length of time to establish the fact that a loss was being sustained.

The current policy of OPA applies to all other commodities as well as drilling and producing equipment. But when the manufacturer of oil-field equipment completes a war contract and converts all his facilities to production of his peacetime line, he is merely changing from one essential war product to another. Therefore it is important that provisions be made for rapid processing of price petitions in this industry.

One manufacturer pointed out that under the present policy the smaller manufacturers would be inclined to discontinue production of profitless items without ever filing a petition for increase, feeling that their chances for obtaining an increase were slight. The policy on price increases, OPA representatives said, was established during a period when war orders brought on a rapidly increasing volume of business to compensate for the diminishing profits in commercial lines. A need for certain modifications because of reversed ocnditions is being felt and a new policy is in the formulative state.

ODT Program Designed to Salvage Nation's Trucks

WASHINGTON, D. C. — Maintenance of the nation's vital motor transportation system through the most economical use of replacement parts and the least drain upon parts-manufacturing facilities is the objective of a rehabilitation program announced last week by Office of Defense Transportation.

The program calls for rebuilding and overhauling trucks through use of rebuilt exchange engines, transmissions and rear axle assemblies. These larger component truck units will be exchanged at dealer garages for rebuilt units, with a minimum truck layover. This is designed to keep vehicles on the road more days during the year and minimize deterioration of truck transportation equipment.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Postwar Rubber

IT becomes more and more apparent that the petroleum industry in its production of synthetic-rubber components has something more than a war infant if, in the postwar period, it is alive to its opportunities brought about by a new technology and changed economic conditions.

While official statements continue to be conflicting as to the status of this new enterprise, managements and operators, as their experience in manufacture and utilization widen, are increasingly enthusiastic regarding the future of this development which has achieved a major rating.

The present and the probable future of this new petroleum activity were revealed in the recent completion of the Port Neches plant, in several respects the greatest manufacturing achievement of the war and an outstanding example of cooperative accomplishment. This petroleum unit, with 700 employes, will shortly be producing butadiene, the principal component of synthetic rubber, at the rate of 100,000 tons annually, or about 13 per cent of the projected national output at the close of this year. In rubber manufacture this unit will do the work of more than 100,000 East Indians tapping 600,000 acres of rubber trees.

As to the wearing properties of new tires, Harvey S. Firestone, Jr., in the March 4 issue of the Saturday Evening Post explained: "It took us 40 years to learn how to build natural-rubber tires to give the high mileage, and at the low cost, of prewar days. The industry has high hopes that eventually synthetic tires of all kinds and sizes will equal the natural-rubber product in every way."

The present head of a family which has been associated with rubber manufacture from its early history emphasized the strong position of the new manufacturing techniques, using a figure of 16 cents per pound for present costs. This figure compares with the 22½-cent-per-pound price paid for the prewar stockpiles of natural rubber.

The petroleum industry has an obligation to see that everyone directly concerned — and that includes practically the entire population of this country — understands the strong position of petroleum in this new industrial art. Largely because of the equipment involved and the fact that the raw materials were immediately available, operations involving the production of butadiene from alcohol were given precedence over petroleum hydrocarbons in the early stages of the government program. In over-all costs, the petroleum route has the advantage over the alcohol procedure.

The output of all plants is needed now and, according to Mr. Firestone, will continue to be for at least a year or two after the war ends. Later the synthetic operations probably will have the strong competition of natural rubber in all markets.

Petroleum's manufacturers should now be preparing for this return to normal competitive conditions in domestic and world trade. They not only have the strongest position in synthetic operations, but present costs can be reduced and new markets added when managements have the opportunity to apply prewar operating standards.

Operators should protect themselves and their customers by seeing that their present plants are not junked in the interest of a misguided world-trade program and that they are not forced to compete with what amounts to subsidized operations to the end that synthetic-rubber manufacture, like all petroleum activities, shall be based on the sound foundation of a free enterprise.

More Tankers Permit Rise in East Coast Refinery Runs

WASHINGTON, D. C.—An increase in East Coast refinery operations to daily runs of 780,000 bbl. was predicted here last week by the Petroleum Industry War Council committee on economics. The higher rate of refinery operations, the committee pointed out, will be made possible by assignment of 50,000 bbl. of additional tanker capacity to the daily coastwise deliveries at East Coast ports. At the projected rate of processing this month, East Coast refineries will increase output of products over February levels by 20,000 bbl. daily, the report said.

A brighter outlook on petroleum supplies for the East Coast area, with the exception of a temporary stringency in New York vicinity, was reported.

PIWC announced that the petroleum situation on the East Coast seems to be "somewhat better than a month ago though the situation in the New York area will be critical until the 20-in. pipe line is in regular operation, which should be within a few days."

Chairman Robert E. Wilson of PIWC's committee on petroleum economics ascribed the improvement in East Coast stocks to a combination of several factors.

"Tank-car movements during the past several weeks have improved considerably, having averaged about 710,000 bbl. in the first 20 days of February as against the low level of 575,000 bbl. during the week ended December 25, 1943," Wilson said. "Expectations are that this movement will reach 720,000 bbl. daily, or better, in March."

The PIWC committee found that the Midwest still has idle refining capacity due to a shortage of transportation of crude into that area but expressed the hope that this situation would be remedied in the near future.

Russia to Make Survey of Its Oil-Bearing Areas

NEW YORK.—Plans have been announced by the Russian Government for a survey of all oil-bearing areas in the country, a broadcast recorded here reveals. The Moscow radio said 150 prospecting parties would be sent out to determine Russia's potential petroleum deposits. Main work of the prospectors will be centered in Uzbekistan, Saratov and Stalingrad provinces and in the Tator republic.

"Last year," the broadcast said, "oil prospectors located over 60 new oil-bearing areas. Geologists are now going to investigate these."

Buffalo Oil Co. Acquires Holdings of Maljamar

DALLAS, Tex. — Buffalo Oil Co., Dallas, has contracted to buy the stock of Maljamar Oil & Gas Co., which opened the Maljamar field in Lea County, New Mexico. The $3,025,000 consideration is reported to be on the basis of $5.50 a share. Maljamar has a gross allowable production of 1,500 bbl. daily from 56 producers on 3,000 proved acres in the field and approximately 10,000 acres of outlying leases. The block includes one wildcat pumper.

Pan American Dedicates Texas City Cracking Unit

TEXAS CITY, Tex.—The new fluid-catalyst cracking unit and other recently completed refining facilities of Pan American Refining Corp. were dedicated here March 9. The production from the new unit will go toward prosecution of the war effort. Impressive ceremonies marked completion. The program included a dinner for guests of the company at the Galveston Chamber of Commerce.

I.P.A.A. Issues Booklet on Foreign-Oil Basic Data

WASHINGTON, D. C. — A booklet outlining a basis for the formation of a foreign-oil policy for the United States has been published by the Independent Petroleum Association of America for distribution to members of Congress and others interested.

Quoting much original source material, the booklet reviews our foreign oil policy, or the lack of one, in the past, and the basis for such a policy at present as outlined by the Atlantic Charter and other recent documents.

The principal target of the publication is the Petroleum Reserves Corp. and its recently announced agreement to construct a crude-oil pipe line across Saudi Arabia. Quotations from PRC president Ickes and other sources are given to show that this activity probably goes beyond the outlines of our national policy and beyond the authority contained in PRC's charter.

The booklet will form part of the material which the oil industry intends to present for the consideration of the special Senate committee on foreign-oil policy, expected to be appointed within a few days.

Concession to American Oil Group Refused by Turkey

ANKARA. — An American group, said to consist of three Standard Oil companies, has been refused oil-exploration rights in the Adana region by the Turkish Government, according to reports here. The group is understood to have requested a 99-year concession, under which it would drill exploratory wells. If production should be established, half would be turned over to Turkey. The other half would go to the American companies for export after being moved to seaboard by pipe line.

Venezuela and Trinidad Split Gulf of Paria Waters

An important step has been taken toward the eventual exploration and drilling for oil in the Gulf of Paria, between Venezuela and Trinidad. The Venezuelan Government and the British Government, acting through the governor of Trinidad and Tobogo, have reached an agreement for the division of mineral rights on this marine prospect. For this purpose a northeast-southwest line has been established through the gulf, intersecting Patos Island on the northeast and Soldado Rock on the southwest.

Exploration and marine drilling here probably will be delayed until after the war, but concession bids will be made prior to that time.

Oil possibilities in this gulf long have been considered with favor. Commercial production is already established both on the shores of Venezuela and Trinidad, bordering Gulf of Paria waters.

Sinclair-Wyoming Raises Salt Creek Crude Posting

Sinclair-Wyoming Oil Co., retroactive to February 12, posted a 5-cent increase for crude oil in the Salt Creek, Wyoming, field. The new price will start at below 21 gravity, 85 cents. Twenty to 20.9 gravity, 87 cents, with 2 cents increment for each degree upward to and including 40 gravity and above at $1.25. The advance was authorized February 12 by the Office of Price Administration.

Manufacturing Rates Rising on Most Critically Needed Petroleum Equipment

by Frank A. Watts

Substantial rises in the production of most urgently needed petroleum equipment are confirmed in these excerpts from the report presented by Frank A. Watts, director of the Materials Division, Petroleum Administration for War, who reviewed the outlook for the Petroleum Industry War Council. Emphasis is placed on increased production of pumping units, internal-combustion engines and repair parts, tool joints, and rock bits.

PUMPING unit manufacturers are increasing their production of oil well pumping units. During the past 3 months, the production of pumping units has been increased by 22 per cent, from a total of 470 to a total of 568 units a month. If that rate of increase continues, the output will reach the 1940-41 average production by August 1 of this year. Based on today's rate of producing pumping units, the backlog of orders booked by all manufacturers is equal to 9 months' production. If the output is returned to normal, today's backlog would be equivalent to 7 months' production. Although we do not now know of any oil wells which are shut in for lack of pumping units, a shortage rather than a surplus exists. There will continue to be a greater demand than supply until the output has been increased to, or slightly in excess of, the 1940-41 average. PAW is working with pumping-unit manufacturers to assist in expediting the delivery of bearings, gears, and other components.

Plans are developing which it is hoped will provide a minimum but adequate supply of repair parts for the essential automotive equipment of this country, including that of the petroleum industry. In the meantime, petroleum operators who are unable to obtain components required for the repair or maintenance of their trucks are invited to apply for help to the nearest ODT office.

A small portion of the new trucks now rolling off the manufacturers' assembly lines are being directed for civilian use. We are told that during January, 3,000 new trucks were produced and delivered for civilian use. Since petroleum operations head the urgency list, petroleum operators will usually be able to obtain new trucks whenever real needs exist and the operators' applications explain and establish the needs.

Repair parts for thousands of internal-combustion engines which are in use in drilling, production, transportation, and other petroleum operations are being delivered to oil-field engine distributors and suppliers in steadily increasing quantities. Most engine manufacturers are cooperating in an effort to produce, and channel to their oil-field distributors and suppliers, an adequate stock of repair parts to maintain petroleum operations.

Authority has been extended to the manufacturers of rotary rock bits and core bits to acquire alloy steel which will enable them to produce rock bits and core bits equal to or possibly greater in life than prewar bits. Under the new arrangement, alloy steel which will be available to bit manufacturers for use in cutters, cones, and other working and formation cutting components is the identical alloy steel used before it became necessary to acquire NE steels. The alloy-steel-scrap situation makes it necessary that manufacturers continue the use of NE steel for bit bodies. The use of S.A.E. 4815 alloy steel in cutting and working components should enable the manufacturers to take full advantage of any changes in bit design engineered during the past 2 years to increase the efficiency and life of bits.

Most manufacturers are increasing their production of equipment required for oil-well drilling and oil-producing operations. Supply and demand for the majority of these items are rapidly nearing balance. PAW is now able to allot to any equipment manufacturer all material required for his production of equipment required in petroleum production operations. In addition, PAW is in position to expedite the delivery of components—bearings, castings, forgings, etc.—required in the manufacture of this oil-field equipment.

Indications are that nearly 1,400 rotary rigs are in operation in this country. That number is 20 more than the 1943 high which occurred on December 21, 300 more than the 1940 average, 200 more than the 1941 average, 600 more than the 1942 average, and 370 more than the 1943 average. Figures cover only those rigs which are actually drilling at the time of the report and do not include those which are rigging up, tearing down, or moving from one location to another. Since nearly 40 per cent more time is now required to drill and complete the majority of rotary wells than was required during 1939, 1940, and 1941, new wells are not being completed as rapidly as the drilling rig comparison would indicate.

As stated in earlier reports, there is every indication that drilling operations will be conducted during 1944 at a considerably greater rate than during any recent year. The accelerated program is one which is required to supply petroleum and products to fill military and other essential demands.

Recently, PAW authorized the manufacture of welded lease tanks in addition to the bolted tanks. Their production had been prohibited until this authorization was granted. Both welded and bolted tanks are now obtainable for production operations. Tank manufacturers and petroleum operators are urged, however, to keep the weight of the welded tanks down to the minimums established by A.P.I. standards.

Dr. Smoley Tells Graduates Of Progress in Refining

CAMBRIDGE, Mass.—Dr. E. R. Smoley, Lummus Co., New York, who graduated from Massachusetts Institute of Technology in 1919, delivered the 25-year speech to the class of 1944 at class-day exercises held February 26.

Dr. Smoley recounted how oil refining had advanced in 25 years from pot-still distillation, with a million bbl. of crude yielding 200,000 bbl. of indifferent gasoline to a mammoth industry in which the same volume of crude yields 500,000 bbl. of gasoline, including the 100-octane, upon the output of which the fortunes of a world war rest. "A petroleum engineer," he said, "is a sort of fuel bartender. He mixes a power cocktail and measures its potency by octanes."

March Demand Outlook Sustains Need for Record Oil Operations

WASHINGTON, D. C.—Demand for motor fuel in March is expected to total 57,000,000 bbl., the Bureau of Mines reported here last week, indicating an increase of 27 per cent over the actual requirements for the same month a year ago.

Total demand for motor fuel may show a gain of approximately 28 per cent in the first quarter of 1944, the bureau's forecast pointed out. The large increase is due, the report said, to the reduction in civilian consumption in the first quarter of 1943 before military requirements had begun to assume such large proportions.

The relative gain in total demand, the forecast analysis continued, probably will be much less in subsequent quarters of 1944 because war demands rose rapidly after the first quarter of 1943. Refinery yields of gasoline are expected to average 38.5 per cent in March compared to a manufacturing rate of 35.79 per cent on volume of crude charged to stills in the same month last year.

The daily average supply of domestic crude oil estimated to meet the market demand this month is 4,429,000 bbl., 672,000 bbl., or 18 per cent, higher than required a year ago.

SUMMARY OF FORECAST FOR MARCH
(Thousands of barrels)

	Forecast March 1944	Actual March 1943
Motor-fuel demand	57,000	44,979
Gasoline production	51,510	40,094
Natural used at refineries	5,690	4,907
Total refinery production	57,200	45,001
Other natural and imports	1,800	1,188
Incr. in finished stocks	2,000	1,210
Available supply	57,000	44,979
Crude-oil requirements:		
Per cent gasoline yield	38.50	35.79
Refinery crude required	133,800	112,013
Domestic crude runs	130,800	111,909
Exports, fuel and losses	6,500	4,571
Total demand for domestic crude	137,300	116,480
Daily average	4,429	3,757
Incr. in domestic stocks	.....	5,080
Actual production	.....	121,560
Daily average	.....	3,921

*The term "motor fuel" as used in this report includes gasoline and naphtha used for all purposes, but does not include heavier distillates used in the operation of tractors or burned in diesel engines.

Congress Receives FTC Report on Oil Traffic

WASHINGTON, D. C.—The Federal Trade Commission this week sent to Congress the petroleum chapter of its lengthy study of distribution methods and costs, based chiefly on 1939 data. The report compares pipeline, tanker and rail charges, estimated percentage of major company dominance in markets in various areas, gives many figures on average costs of marketing by different types of petroleum retailers in various regions, and describes the methods used by majors to control distribution through leased and independent stations.

The report contains no conclusions except that the curtailed market due to gasoline and tire restrictions will bear more heavily on independent than on major company stations and that the longer the war lasts the greater will be the degree of concentration in the marketing of petroleum products. The FTC suggests that supplier-dealer arrangements and relationships should be critically examined to the end that the interests of small independent dealers shall be conserved to the maximum degree in distribution functions.

International Obtains Concession in Ecuador

International Petroleum Co., Ltd., affiliate of Imperial Oil, Ltd., has obtained a concession embracing approximately 1,000,000 acres in the states of Esmeraldas and Manabi, Ecuador. The area lies along the Pacific Coast, west of the Andes. The concession calls for the beginning of exploration work within 2 years.

Oil Compact Movie to Be Shown at New Orleans

OKLAHOMA CITY, Okla.—"Oil for Tomorrow," the Interstate Oil Compact Commission's educational film, will have its grand premiere before industry leaders and public officials at the compact's spring quarterly meeting April 3 and 4, Roosevelt Hotel, New Orleans, La. Scheduled as a part of the first day's public session of the commission, the 30-minute movie, in sound and color, will tell the story of progress in oil and gas conservation.

Gas-cycling operations, a source of high-octane gasoline and an important industry in Louisiana, will be the theme of a paper by R. L. Keyes of New Orleans, assistant division manager of The Texas Co.

Sharing interest on the 2-day program will be the discussion of Louisiana's modern oil and gas conservation law by George A. Wilson, former general counsel for the Department of Conservation, now director of PAW's Transportation Division, Washington.

Ute Indian Agency Offers Southern Colorado Lease

DENVER, Colo. — Bids will be opened March 15, 1944, at the Consolidated Ute Indian Agency, Ignacio, Colo., for an oil and gas lease on 1,280 acres of tribal land in La Plata County, southwestern Colorado. It adjoins on the east a lease on 2,080 acres on the Barker dome bid in last June by the Southern Union Production Co. The structure produces gas in the Dakota on the New Mexico side.

The lease will provide for a test to the Dakota or 3,500 ft. to begin within 6 months after approval.

DEATHS

T. J. Boyer, 84, retired oil driller, died March 6 at his home in Tulsa.

Joseph G. Bowman, 92, pioneer oil-well driller, died February 25 in Oil City, Pa. He had spent most of his working life in the oil fields of Pennsylvania and West Virginia.

James E. McDonald, 53, general sales manager of The Edward Valve & Manufacturing Co., Inc., East Chicago, Ind., died February 25. He was a graduate of University of Illinois and a member of American Society of Mechanical Engineers. He had served as chief engineer and plant superintendent before becoming sales manager.

W. H. Eastham, division superintendent of Royalty Service Corp., Long Beach, Calif., died February 27 in a hospital in San Francisco, Calif. Before joining Royalty in 1938, Eastham for 9 years was connected with Sunray Oil Co., with headquarters in Oklahoma.

Charles W. Deming, 79, retired oil-field worker, died March 2 in Bradford, Pa.

Frederick E. Faulkner, 79, inventor of the oil-cutting process which bears his name and former superintendent of the Bayonne, N. J., plant of Tide Water Associated Oil Co., died March 1 at his home in Bayonne.

Will A. Carnes, 53, for 26 years buyer for The Texas Co., Houston, Tex., died March 4 in a hospital in that city.

Equipment Savings and Operating Economies Are Attained for Unitized Salt Creek Field by

Streamlined Production System

by Neil Williams

One phase of the conversion of the Salt Creek field, which was developed originally under diversified lease-ownership conditions, to unitized operation, has been the establishment of more centralized production control. Gathering systems have been revamped and unnecessary facilities salvaged.

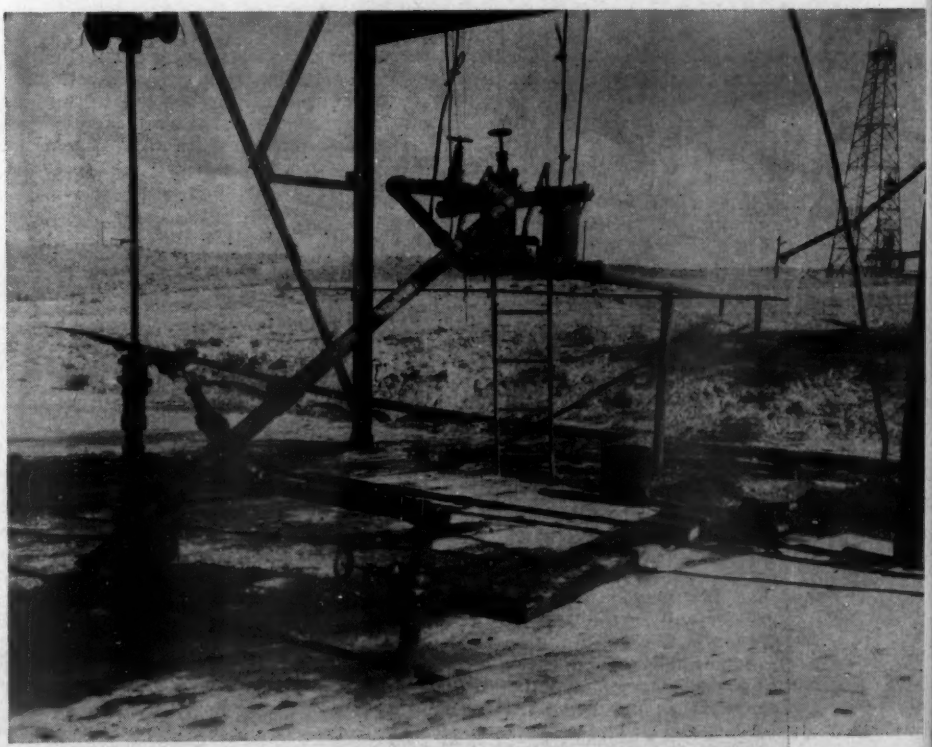
DURING the past 2 years, Stanolind Oil & Gas Co. has been engaged in revamping surface production facilities in the Salt Creek field, Natrona County, Wyoming. The project, now nearing completion, has involved consolidation and relocation of tank batteries, treating units, condensate drips, etc., and relaying of field lines. In it, the production system has been entirely redesigned and streamlined, and installations have been modernized, and, so far as possible, standardized. The work has been carried out gradually with a minimum interference with regular field operations.

The program has taken in the entire unitized portion of the field, of which the above company is the unit operator. This covers practically all the field except a comparatively few outlying leases, and comprises an area from 8 to 9 miles long and from 2 to 3 miles wide, representing more than 1,000 wells, of which upwards of 1,100 are producing. On this scale the revamping project has been a major undertaking.

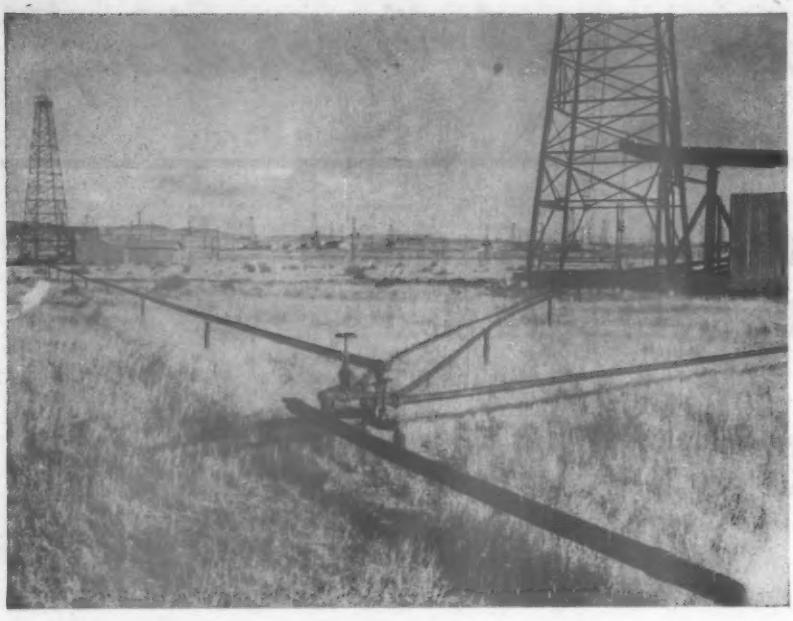
Production facilities in the Salt Creek field prior to initiation of the revamping program consisted of a varied assortment of individual lease and well installations provided during the field's early development. The field, one of the oldest as well as largest in the Rocky Mountain region, was drilled up under competitive, diversified lease-ownership conditions.

Although main development of the field had been completed approximately 10 years before, the properties involved in this project were not unitized until 1938. Prior to this, Midwest Refining Co., and later Stanolind Oil & Gas Co., operated most of the leases, but this was under contract with the various owners, and as separate accountings had to be made for the individual leases it was necessary to maintain the respective lease facilities. With unitization and pooling of interests, separate accounting has been eliminated and it has been possible to consolidate many of the operations and provide a more centralized field-wide production system.

Several objectives have been real-



A graded vacuum line with elevated well end and sloping wing connection. At head of line are two calcium chloride "baskets"



Converging vacuum lines from group of wells to common drip accumulator at central low point. Some groups have six to eight wells

ized by the project. Of particular importance at this time, a sizable quantity of equipment and materials, consisting of tanks, boilers, heaters, pumps, lines, etc., has been salvaged for later reuse here or elsewhere. Operations have been centralized and simplified, personnel requirements have been reduced, and operating economies attained. In addition, the new system has been designed to make possible certain more effective practices.

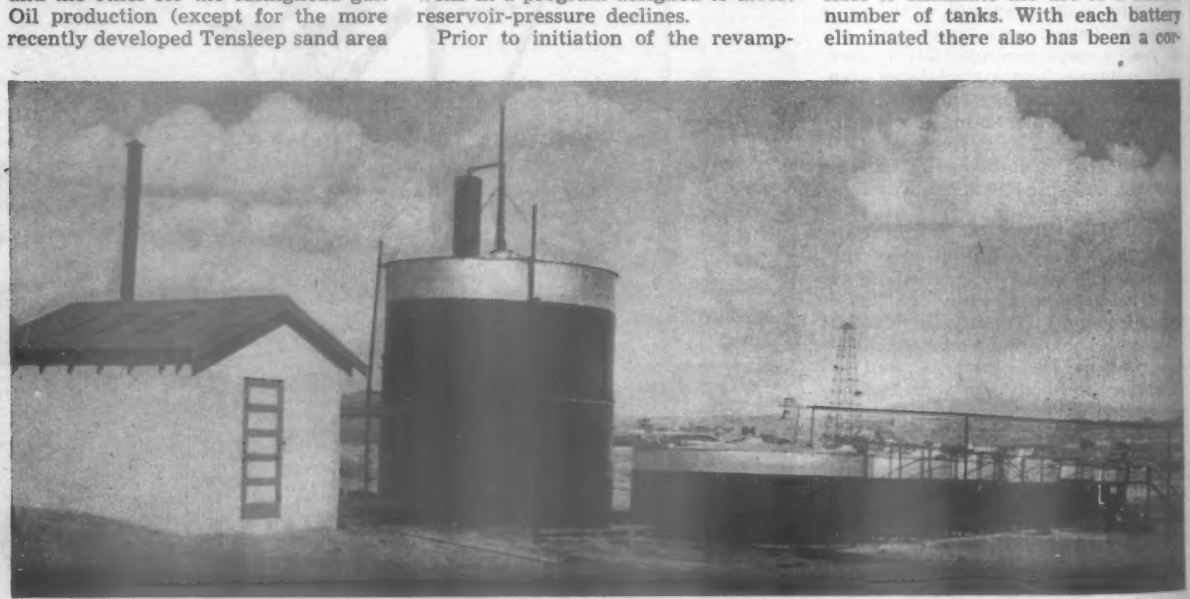
Operations in the field embrace two systems, one for the oil production and the other for the casinghead gas. Oil production (except for the more recently developed Tensleep sand area which comprises a separate unitization) for many years has been reduced to the pumping stage and is handled through the regular oil-gathering system. No gas is recovered directly from the oil production, but from the well casingheads some gas, ranging in volumes from 1,000 cu. ft. to 100,000 cu. ft. daily per well, is pulled under vacuum. This is picked up in a separate gathering system by centrally located vacuum stations, from where it is boosted to a main compressor plant and returned to producing horizons through key input wells in a program designed to arrest reservoir-pressure declines.

Prior to initiation of the revamping program, all wells were pumped into individual 250-bbl. tanks, located at the respective wells. As these tanks were filled, the oil was pumped, by means of pickup pumps which were moved from well to well as needed, to the main lease storage battery, where water was treated out of it. Each lease battery, in addition to the gun barrel and storage tanks, included one or two boilers to generate steam for heating the oil in treating and for facilitating handling of it in cold weather. From the lease battery the oil was repumped to the field gathering system and pipe-line storage.

Central Tank Batteries

Under the new system, use of the individual well tanks is being eliminated and well production is pumped direct to central tank batteries and gathering stations. These replace the individual lease batteries and have been placed without regard to lease boundaries at locations where they can serve the field most conveniently. Salvaged tanks and other equipment from the former lease batteries have been used in their installation, and in some cases it has been possible to make use of a battery already in service.

Through centralization, the number of tank batteries has been reduced from several hundred to between 25 and 30. Since the over-all working capacity of the individual lease batteries had been greatly in excess of current field production needs, it has not been necessary to provide an equivalent total capacity in the central batteries, and by effective redistribution of this capacity according to the wells served by the respective batteries it has been possible to eliminate the use of a sizable number of tanks. With each battery eliminated there also has been a cor-



Typical centralized tank battery provided in Salt Creek streamlining program. Building at left houses boiler for heating oil

responding reduction in number of gun barrels, heating plants (consisting of one or two steam boilers each) and pumping units, as well as a considerable quantity of miscellaneous auxiliary equipment, lines, fittings, etc.

Installations of central batteries have been standardized so far as possible. Stock tanks composing them are 500-bbl.-capacity units. Differences in capacity requirements are taken care of by the number of tanks provided.

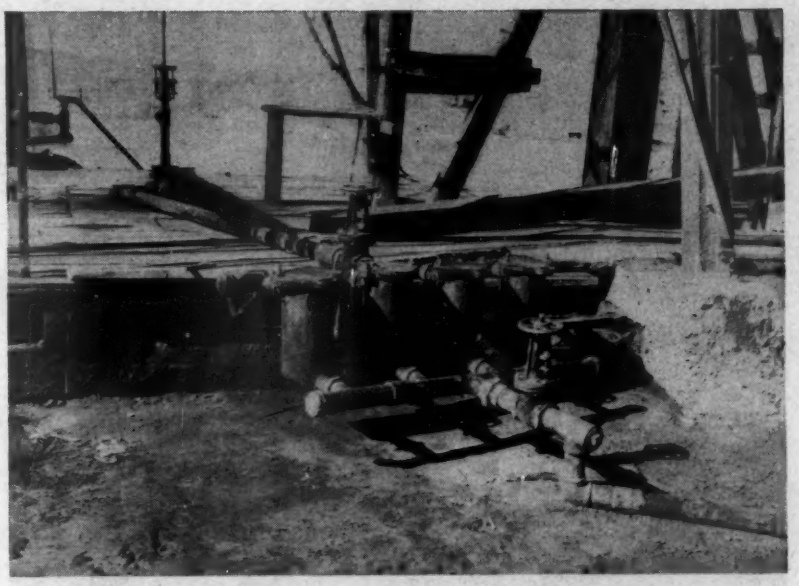
Locations of the batteries have been carefully selected to make the most effective utilization of gravity possible in reducing the pumping load of the wells to the batteries and to reduce the number and length of lines. In this, each battery is placed in the lowest suitable spot for the greatest number of wells in the area served. Since the terrain is semirugged, laying of lines to take advantage of all grades possible with consideration of distance and elimination and consolidation of lines has required considerable ingenuity and planning. Formerly, individual lead lines were provided for all wells to the lease batteries. These generally were laid without much regard to topography. Usually no attempt was made to avoid elevations, and frequently lines were laid over hills. Present lines, wherever possible, have been directed around elevations. Increased distances have been avoided by joining and laying of lines to connect with other lines. More than 10 miles of oil lines (savings in gas lines additional) have been eliminated and salvaged in the project.

Drainage of Vacuum Lines

One of the principal considerations in revamping the casinghead-gas gathering system has been to provide grades in all vacuum lines from the well casingheads to central low points where drips are located underground for drainage of condensation that forms in the lines. In this, particular attention has been given to regrouping of wells in the various vacuum systems, not only to eliminate as many drips as possible and consolidate lines but also to equalize vacuum on the individual wells comprising the respective groups.

The vacuum pulled varies from 2 to 4 in. The gas, in addition to being fairly wet, carries considerable water vapor. Formerly, the lines from the wells were laid without much regard to grades and liquids resulting from condensation under vacuum would accumulate in low places ahead of drips. This caused frequent trouble, both by the interference with maintenance of vacuum and, in winter, by the freezing of the water. Lines often had to be opened and drained.

Advantage has been taken of terrain wherever possible to establish grades, and, as in the case of providing gravity flow in the oil lines, this has required considerable ingenuity in routing of lines. In many installations it has been necessary to elevate the well end of the line with a riser wing connection from the casinghead to the high point and then provide successively shorter leg supports for the line downward to the central low point.



Multiple calcium chloride basket installation on well casinghead vacuum line at Salt Creek. Number of baskets varies with volume of gas handled

Central drip (buried) showing surface connections for condensate collection tank truck. Condensate accumulation in drip is displaced with propane

Drip accumulators are cylindrical steel tanks having capacities of from 300 to 400 gal. each. Formerly there were approximately 450 of these in use. In a number of instances there were drip installations for individual wells. By regrouping of wells and eliminating all individual well installations where possible, approximately 70 drips have been eliminated. Now there are many installations in which a half dozen or more wells are served by a single drip. This has resulted in important savings not only in the actual accumulators eliminated and their maintenance but also in the work and manpower required to drain them periodically.

Vacuum System

Vacuum lines from the individual wells are of 2-in. size. The individual lines of each group of wells tie into a common 4-in. line which passes through the central drip at the low point and connects with the main 6-in. or 8-in. vacuum line serving that section of the field. Savings in these lines resulting from the revamping project amount to approxi-

Liquid calcium chloride lubricator at head of a depression on main vacuum line

mately 6 miles of 2-in. pipe, 2½ miles of 4-in. pipe, 7 miles of 6-in. pipe, and 4 miles of 8-in. pipe.

There are eight vacuum plants, centrally located in different sections of the field. These stations, taking suction from the main vacuum lines, discharge at pressures varying from 8 to 18 lb. to the central compressor plant for return of the gas to the input wells. Separate booster lines to the main plant are provided, these being 8 in., 10 in. and 12 in. in size. Gas-return lines from the main plant are 8 in. The booster lines to the main plant and the gas-return lines have not been included in the revamping project.

Because of the extremely cold weather in winter, special precautions are taken to prevent freezing of water that condenses in the gas lines. Calcium chloride "baskets" have been devised and installed at the well end of each of the individual vacuum lines. A basket consists of a housing made from a section of 8-in. casing about 18 in. long, the bottom of which is sealed and the top fitted with a removable cover for insertion of an inside container, made of screening, for the calcium chloride in solid form. It is installed in the head end of the vacuum line with gas inlet at the top and outlet at the bottom, so that the gas is pulled downward through the calcium chloride.

Each basket holds between 2 and 3 lb. of calcium chloride. The number of baskets in a single installation is dependent upon the volume of gas produced and the quantity of calcium chloride needed to prevent freezing. Multiple basket installations are operated in parallel by means of inlet and outlet headers. The calcium chloride in a basket can be replaced quickly by removal of the cover, held by only two bolts. Valves are inserted, both in the inlet and outlet lines, for closing the lines while the cover is off.

Grades in the lines insure drainage of all water into the drips at the central low points where freezing is forestalled by the calcium chloride treatment. The drips are drained regularly and frequently as required by displacing the liquid content with propane. A special truck, equipped with a 1,400-bbl. condensate tank and a 30-gal. propane tank, is operated for this purpose. Each drip has an inlet and outlet connection to which the truck's propane and condensate collection tanks, respectively, can be quickly coupled.

Calcium chloride in liquid form is lubricated into the main lines, at points just ahead of all major downgrades to low places. The lubricators are containers fabricated from short lengths of 6-in. pipe with ends sealed. They are mounted on the top side of the line with two 2-in. connections, one at each end, which allow the chemical to feed gradually into the line. Drips are not provided for all low places in these lines but the danger of water accumulations is not great as most of the water condensation from the gas production occurs and is removed before reaching these lines.

Powder Metallurgy

POWDER metallurgy has recently come to the attention of petroleum industry because of its possibilities in the reduction in cost of manufacture of machinery and equipment items used in the field. Through this technique, complicated machining jobs are replaced by a stamping operation during the manufacture. As the name implies, powdered metals having the desired qualities are pressed into shape. Oilless bearings, clutch faces, brake parts, cemented carbides are the most important applications of the technique to date.

Iron and brass parts for ordnance and electrical equipment are presently being made by this method. The more complicated the machining job the more likely powder metallurgy will be able to compete from a cost angle. Stainless steel powders can be more readily pressed with admixtures of nickel, copper or silver, according to reports. An interesting development is the sintering of cold-pressed pieces under comparatively moderate loads to produce the desired quality finished product.

Powder metallurgy can produce items having the same characteristics as machined parts and generally the products of this technique give satisfactory performances.

The method is new and is not without its headaches, the principal one in manufacture being die wear. Uniform density is sometimes difficult to obtain. Eventually, a number of common items, presently machined, may be produced by this method if a saving in cost can be shown.

BOOKS

DEVONIAN SYSTEM OF WEST VIRGINIA. Volume 15 of the West Virginia Geological Survey. By Herbert P. Woodward, assistant geologist. 655 pp.

This report is the second volume of a projected series dealing with the systematic geology of the state. West Virginia contains a broad Devonian outcrop that compares favorably in size and complexity with analogous outcrops in other Appalachian states, and this volume contains a description of Devonian rocks wherever they occur in the state.

PRACTICAL DESIGN OF WELDED STEEL STRUCTURES. By H. M. Priest. Published by American Welding Society, 33 W. Thirty-ninth St., New York. 153 pp., $1.

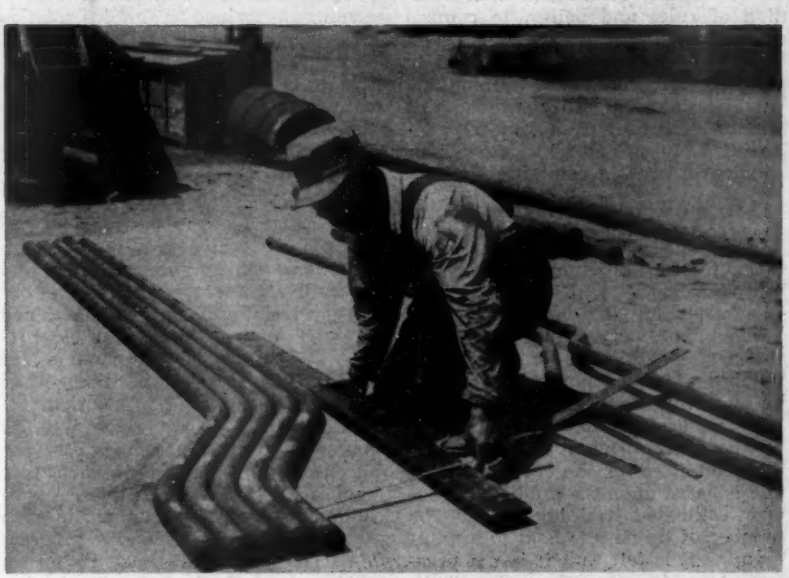
Here are set forth the essentials of welding and welded construction which engineers and fabricators will find valuable in the preparation and execution of welded designs. The various welding processes are discussed, specifications for electrodes, types of welds, welding positions, qualification tests and inspection are treated in concise form. Temperature effect, both physical and metallurgical, have received extended attention.

UNION OIL CO. OF CALIFORNIA PLANS AND INSTITUTES

New Cooperative Methods of Training And Upgrading Refinery Employes

by James E. Hill*

An outstanding development at Union Oil Co. of California is the training program which has been worked out in connection with the Oil Workers International Union. This program is used to train and develop the new maintenance and operating workers of the refineries, and is reported to be a valuable asset under present conditions. This article reveals the details of the cooperative program.



Pipefitter instructor checking uniformity of small offset bends made by trainees

A FLOOD of millions of dollars has been poured into expanding refinery facilities for the most efficient production of urgently needed products. Drops, or at most, the merest trickle of funds, have been expended in training men to operate and maintain these facilities. By comparison with other industries that are engaged in war work, oil refiners have been backward in establishing organized programs for upgrading older personnel and for giving basic training to new employes. Coupled with the lack of progressive training systems, the overburdening of experienced employes, and the increasing complexity of modern refining plants, the quality of available manpower has decreased. As a result of these factors, many refiners face a critical training problem.

In 1940 when Union Oil Co. of California and the O.W.I.U. (C.I.O.) revised their union contract, provisions were incorporated for a training and qualification program under which employes, instead of being advanced on the basis of seniority only, would be required to pass severe written and performance tests to demonstrate their abilities to qualify for promotion. This plan was so constructed that management and labor were jointly responsible for the organization, development, and the operation of all phases of the program. Fortunately, at the two main Pacific Coast refineries of this company, the plan was well under way when this country entered the war and it has been of great aid in expanding and supplying replacements for the crafts and operating forces. For example, the number of journeymen in the crafts forces has been increased, through training and qualification, by approximately 62 per cent since the inauguration of the program. The crafts involved are blacksmith, boilermaker, brickmason, carpenter, electrician, instrument repairman, insulator, leadburner, machinist, painter, pipefitter, rigger, sheetmetalsmith, tank-car repairman, valve repairman and welder. The plan also covers inspectors in the control laboratories and various plant operators. Later it is planned to expand it to include the clerical, warehouse and other groups.

The following paragraphs outline the general organization and operation of the Union Oil Co. program.

Management and labor representatives first worked with the supervisor of training to prepare a policy and procedure manual which outlined the program and formed the basis for all consequent developments.

The actual training work was started in the crafts group where the need was greatest at the time. There was set up in each craft a training committee consisting of two journeymen, a foreman or assistant foreman, and the supervisor of training. The C.I.O. shop men in each craft elected their journeymen members and in practically all cases selected the most highly skilled and qualified men for committeemen. Qualification committeemen were elected later when a sufficient number of men had been trained to justify the conducting of tests.

The training committeemen and expert assistants from specialized phases of each craft first developed a comprehensive outline of the trade knowledge and skills required of a journeyman in that craft. This outline was

*Supervisor of training and safety, Union Oil Co. of California.

called a job requirement record and, by agreement among the workers in each craft, was identical in the two refineries.

A training library was established at each shop and was stocked with reference books, catalogs, visual aids and other training material. The libraries are expanded as new material is available. Drawing equipment, special layout tools, etc., were provided.

Controlling the Program

A general coordinating committee was set up which consists of the superintendents of the departments involved and representatives of labor. The duties of this committee are to settle disputes relating to interpretation of rules and policy, to counsel and aid committeemen in the development of uniform procedure and to check the progress of the training and qualification. In other words, this committee serves as a general governing body and as a hub for all individual operating committees.

Selecting Craft Trainees

The departmental superintendent estimates the anticipated number of journeymen that will be required for each craft for the next few years, based upon expected retirement, transfer, expansion of forces, etc. The number of senior nonjourneymen to be placed upon the training status in any one craft is determined jointly by the superintendent and the training committee for the craft involved, and is based upon the predicted needs and estimated training time. The number of trainees is held to a minimum as it is felt that it is not practical to train men when the likelihood of openings for advancement at the end of their training period is remote. In order to not overload the training work in the craft, the ratio of journeymen to trainees during the war period is kept above five to one when possible. The men remain on their regular pay rate when they enter trainee status.

Checking Craft Trainees

Usually a man who has sufficient seniority to be eligible as a trainee has had considerable helper experience and may have studied beforehand or may have attended night schools in anticipation of training work later on. Therefore, the creditable work experience of each trainee is checked against the job requirement record at the start of his training to determine the phases of the work in which he is already proficient. This is done by the training committee with the aid of the trainee.

The man has the choice of not becoming a trainee if he is satisfied with his present job and does not desire advancement. Such cases are rare and usually involve older men who are near retirement age. In such cases these men sign release forms, yielding their seniority rights to training on that particular occasion.

Type of Training

Trainees receive two types of instruction: On-the-job training and special-assignment training. In on-the-job training, trainees are assigned to work under journeymen instructors and in so far as possible are scheduled on work in which they need experience and instruction.

All instructors are given a J.I.T. course in teaching technics and are checked from time to time as to their application of these principles. A wall summary chart is maintained in each foreman's office, showing the progress of each trainee at all times. By means of this chart the foreman may assign trainees to types of work where the chart shows that they have not gained proficiency. Trainees are permitted to do production work under supervision of a journeyman while training, but as soon as the record shows that they have gained proficiency on each specific job, no additional productive work on this job is permitted. Training assignment slips are issued and rated by the instructors. These data are posted periodically on the wall chart and in the job requirement record and monthly progress reports are issued by each committee, showing the progress of each trainee in each craft.

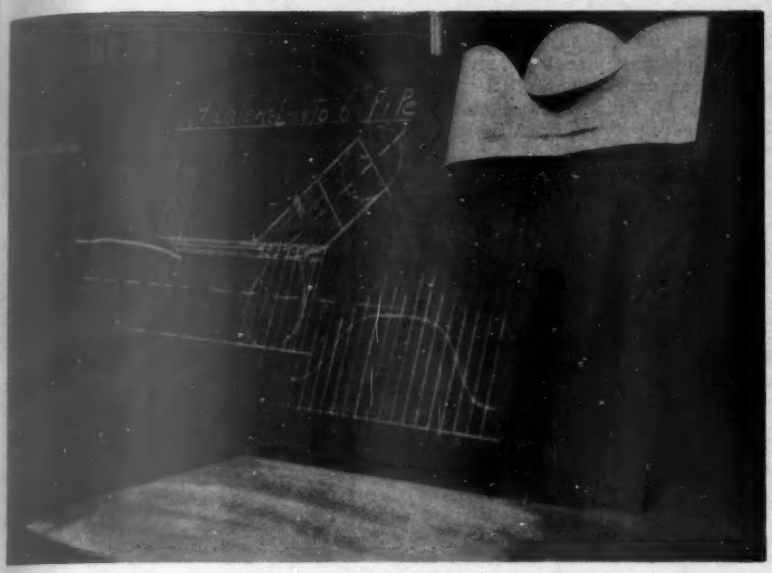
In addition to on-the-job intensive training, each trainee is given 4 hours per week of special-assignment instruction covering phases of work that are not readily obtainable on the job. Depending upon the nature of the craft in question, this time may be devoted to trade mathematics, drawing, sketching, special layouts, and to related work wherein slide talkies, movies, cutaway sections and other visual aids are used frequently. This special training is given during working hours and the trainees are encouraged to take advantage of available night school courses as well.

Training Time

The training committee prepares practical progress tests to familiarize the men with testing technics and to evaluate the progress of the trainees, especially in the theoretical phases of the work. By reference to the foreman's office wall chart or by checking of monthly progress reports, it is possible to estimate when any trainee, who is nearing the end of his training period, may be ready for qualification. Depending upon the craft in question and upon the initial skill and experience of the man when he becomes a trainee, the amount of training time required may range from a year to 3 or 4 years on a peacetime, long-range-training basis. This has been reduced somewhat since the beginning of the war to satisfy the very urgent demand for journeymen.

Obviously, it does not require as much time to train an insulator or

Elementary electrical classroom training for instrument shop trainees



A typical layout problem from a welder's qualification test

a brickmason as it does an electrician, machinist or instrument repairman from the same quality of trainee material. The time for training is roughly proportional to the quantity of special trade knowledge and the complexity of the skills required by each craft.

It is not practicable to compare closely training time in the oil-refining industry with other industries on the basis of job titles alone. A welder, for example, in the aircraft, shipyard and certain other defense industries, usually is a specialist in a few skills. He learns a few technics within a relatively short training period and, within a few weeks, may be placed on a production job as a journeyman welder. His trade skill and knowledge amounts to only a small part of a refinery welder's job requirement. The latter includes both oxyacetylene cutting and welding and arc welding of carbon and alloy steels of various compositions, cast iron, aluminum, bronze, and other nonferrous metals. The refinery welder must be able to position weld both plate and pipe, and he must have a working knowledge of heat treating, especially as it relates to alloys, cast iron, etc. He must be able to make accurate field sketches and read complex blueprints. He must be a plate and pipe layout man and a fitter-upper. These, and other skills and trade knowledges may require a minimum of 3 year's training and practice before a raw beginner of average aptitude may become a beginner journeyman. Even then, he may not be able to perform the great variety of job assignments that he may be required to do as a journeyman. This wide scope of job requirements for refinery-maintenance welder, in comparison with welders in certain other industries, is applicable to many of the other crafts as well.

Preparing Qualification Test Material

The over-all tests for any craft consist of two parts: performance or achievement tests that are designed to correspond to work situations, and an objective written examination. Varying with the craft, the performance tests comprise 70 to 85 per cent of the scoring value of the total test, and consist of from about 8 to 15 individual job tests requiring a total of from 3 to 4 days for completion. Layout, sketch and calculation tests may be added in applicable cases. In the written examination, which requires 2 to 4 hours' time, from 50 to 150 objective-type questions are asked.

Before tests are prepared, the job requirements for the craft are broadly outlined and weighed by at least five men, including the training committeemen and other experienced journeymen, to provide a guide for estimating the relative values of the various phases of the work. The relative scoring value of the different field or shop performance tests or numbers of objective questions for various parts of the test are based upon these weighed summaries.

Each individual performance test is analyzed objectively and relative scoring values are applied to the parts. When possible, working tolerances are included and demerits are assessed against the over-all score for various degrees of accuracy or quality of the work performed. The training committeemen prepare a large reservoir of test material with weighed score sheets for use in future examinations. All test material is kept in a locked file at the training office for use when needed.

These committees, as originally proposed by the policy manual, consisted of two representatives of management and two of labor. If the craft group is small, men may serve on both training and qualifying committees. After about 1 year's testing experience, it was found that the scoring procedure was sufficiently objective to maintain an average maximum deviation of about 6 per cent between the total scores of the various judges for any given trainee. It was noted also that in about 67 per cent of the tests the foremen's scores were the highest and in only about 8 per cent of the cases were they the lowest. In order to lower the cost of testing, the committees were reduced to three men with only one management representative. Later studies of test results have shown that the maximum deviation value for a three-man committee is constant at about 6 per cent with the supervisor still scoring highest in 60 to 70 per cent of the cases.

Qualification Procedure

When a test is announced, the qualification committee reviews the test material recommended by the training committee and may revise or alter the test, if they deem such a step to be advisable.

The superintendent specifies the number of men that he wishes to advance and, with the aid of the training committee, reviews the training status of the senior eligible trainees in order to determine which men should take the test. Obviously, the ideal situation is that in which the senior trainee or trainees have completed their training and have been certified by the training committee as being ready for qualification. However, should a situation arise wherein a senior trainee has not completed his full training schedule, while a junior man has complied with all the requirements, the senior man still has the right to participate. If the training of an otherwise eligible man is so far from completion that he has little or no chance of earning the minimum passing score of 70 per cent, the committee will attempt to dissuade him from applying for the test because of the expense involved.

If no trainees are sufficiently advanced in their work, the test is delayed until a sufficient number of eligible men are available. The preliminary checking of the job requirement records minimizes the necessity for retesting men of questionable ability.

As stated previously, the test consists of about 3 to 4 days of performance test work and about 3 to 4 hours of objective questions. If more men pass the test than there are openings available, the qualified trainees with the greatest seniority secure the advancement and the other trainees are placed on reserve status and need not

take another test. Actual percentage scores are not disclosed to anyone except the trainee himself. Advancement is not based upon competitive scores but upon seniority and ability to pass the 70 per cent minimum requirement.

Following the test the work and scores are reviewed by the committee with each trainee in order to outline follow-up on-the-job training in those branches of the craft wherein the need for such additional practice and instruction is indicated. Certificates of proficiency are issued to all men who pass the test. Those who do not pass may continue their training and are tested later when the occasion arises.

Success of Testing Procedure

To date, 34 tests have been given in 15 different crafts. The average of scores for all trainees who have passed has been 85 per cent. About 3 per cent of those who have been tested have failed and in those cases the training committee had previously recommended that the man be not tested because he had not completed his training and was not ready for test. Because of the critical shortage of journeymen, management had requested that these men be tested in hopes that they might qualify.

As brought out before, the number of crafts journeymen at the two refineries has been increased by training and qualification by about 62 per cent during the last 2 years. It is obvious that if these men had not had the opportunity for intensive training and had been advanced upon seniority alone, without examination, the average quality of craftsmanship would have been definitely lowered.

Plant-Operator Training

Operator training, because of the very nature of its requirements, has not been handled in the same manner as the craft work. In the latter, all of the training is directed towards the skills and knowledge of each particular craft. In operator training, however, certain basic principles and operations must be learned by every trainee who, when he has become sufficiently proficient, is then eligible to receive training on specific operating units. This concept results in the logical division of the program into two parts, basic or general training, and specific or on-the-job training at a given operating unit.

The basis course includes instruction in the use and operation of, for example, pumps, compressors, turbines, heaters, interchangers, fractionating towers and other pressure vessels, and of the usual instruments, regulators, and control devices. For this work, small training areas have been set up at each refinery, and actual operating equipment is available. Nearby, training rooms are furnished with the usual lecture-room facilities and are supplied with visual aids, cutaway sections, and equipment for demonstrating the fundamentals of fluid flow, temperature and pressure measurement, etc. Small groups of six to eight persons are given 1 week of basic training in which the mornings are devoted to principles, while the afternoons are devoted to applications of these principles at selected equipment in the operating units. J.I.T. teaching methods are employed by the specially trained practical instructors.

Following their basic training, the trainees are assigned to specific units for on-the-job training by the regular operating personnel, who also apply J.I.T. methods. Four levels of operator training are recognized and each is handled independently. Experienced operators are required to take refresher courses in work below their regular levels. Later as time permits, it is planned to apply qualification testing to the operator's jobs.

A most interesting aspect of the operator-training program is its use in preparing women for operator's jobs. After preliminary induction training in company policies, management-labor relations policies, and safety, and a short period of service in the labor gang, women may be come eligible for certain operating or crafts helper jobs. With only minor changes, the established program has been of inestimable value in converting women from housewives and others with no industrial experience into skilled operators.

Probable Reasons for Success

Without a doubt the main reason for the success of the plan has been the fact that management and labor have worked cooperatively and harmoniously in developing and operating the program with common objectives. The program was not developed and put into operation overnight. It was guided by a carefully developed and ratified written policy and outline of procedure. Considerable time and some money were required to lay the foundation. Training was started initially in only a few crafts where it was most likely to succeed and then as experience was gained it was gradually expanded until it included all crafts, and eventually the laboratory, operating and other groups. The testing procedures were carefully worked out in the same manner and, as the program grew and more men were qualified without grievances or labor trouble, skeptics gained confidence in its practicability.

To succeed, both the training and qualification plan must be sufficiently simple and direct not to handicap seriously the normal working schedule. It should be operated by the line organization with assistance from staff men as necessary. Managers, superintendents, and foremen must be sold on the need for the practicability of the program so as to secure the proper follow-up. Every journeyman and experienced operator must be impressed with the desire to train his helpers whether or not they are on the trainee status. Every trainee must be imbued with the urge to learn as rapidly as possible and to study at every opportunity. It should be recognized that a desire for study and training is not necessarily innate in employes but, in most cases, may be developed. Therefore, before a program can be successful the need for it must be made so apparent to the worker that he will not only merely accept it but also desire it.

Using visual aids in the basic training of new operators

The remarkable results achieved by the Universal organization would have been impossible without the fine cooperation and support of refinery executives and operating men throughout the industry

CATALYTIC CRACKING
REFORMING
HYDROGENATION
ALKYLATION
ISOMERIZATION
THERMAL CRACKING
HYDROFORMING
DEHYDROGENATION
POLYMERIZATION
UNISOL TREATING
RETREATING
POLYTREATING
SWEETENING

U. O. P. CATALYSTS
U. O. P. INHIBITORS

OIL IS AMMUNITION—USE IT WISELY
Universal Oil Products Co.
Chicago 4, Ill., U. S. A.

CARE FOR YOUR CAR FOR YOUR COUNTRY
Petroleum Process Pioneers
For All Refiners

The Refiners Institute of Petroleum Technology

A training situation includes both physical and psychological aspects. The purchase and installation of equipment, setting up a library, supplying visual aids, and appointing instructors and committees will not alone result in a suitable training situation; human values must be considered. Men who build and operate physical equipment, when planning a training program, must consider especially the psychological aspect and realize that for it to be a success it must be a cooperative effort and that it should be constructed around a plan to develop in the instructor the desire to train, and in the trainee the desire to learn. Instructors should be taught the teaching technics and their applications as so ably outlined in the J.I.T. principles.

A discussion on refinery-training plans would not be complete without at least a brief reference to other related types of training that are applicable to refinery employes.

Induction Training

Plants that are encountering problems of considerable expansion, high labor turnover, employment of new women workers, etc., should adopt a plan of organized induction or orientation training. Such a program should include such subjects as company benefits, company and plant organization, and fundamentals of safety as applied to the new job, etc. The presentation must be simple and direct to guarantee maximum retention. Proponents of the plan recommend training periods from 3 to 5 days under a carefully selected instructor, and claim that the results are immediately apparent in reduced labor turnover, lower accident rates, and easier absorption of subsequent on-the-job training.

Safety Training

To be most effective, safety training should be incorporated in and become an integral part of all other training programs. Safety supervisors should maintain a proper accident record and analysis system in order to objectively determine accident trends so that safety training objectives may be selected, and either regular or spot safety training plans started to offset these trends before they become acute.

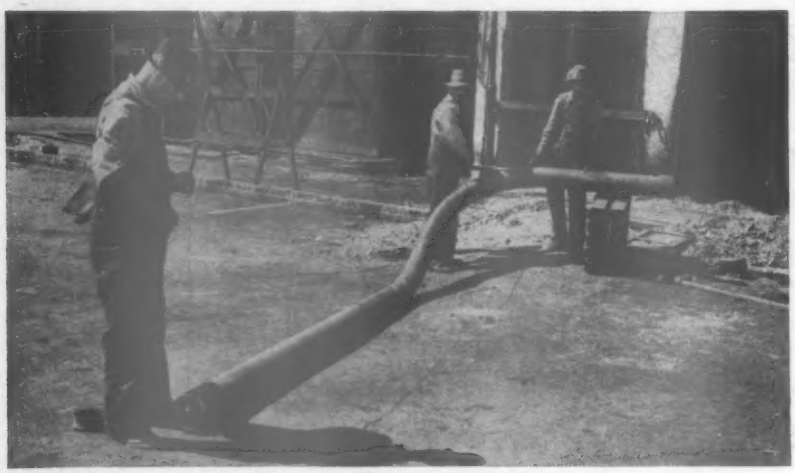
Advantage should be taken of films and other visual aids that are obtainable from the National Safety Council and other agencies.

Fire Training

All refinery employes who may have reason to fight fire should be given field training in the skill of fighting fires with small portable equipment in a special fire-training area wherein full-scale fires may be simulated under test conditions. Stillmen, treaters, and other operators should be given training with larger extinguishers, fog nozzles, etc., using fires of sufficient magnitude in the training area to present real problems. Fire-brigade training is the most advanced type and requires the highest order of teamwork training on the part of the fire marshal and his crews.

To be most effective, both safety and fire training should be done mainly through carefully prepared demonstrations and drills that are conducted under conditions resembling true working situations. The use of poster campaigns and large group discussions may be the easiest approach to the problem, but when used alone, these techniques are of little value.

Although this article relates specifically to the training of craftsmen and plant operators, the subject should not be closed without reference to supervisory training. Employe training, to be effective, must be combined with a well-defined program of supervisory training. Supervisory training can be divided into two main parts: first, knowledge of equipment, processes, materials, and products; and second, ability to lead men. In most war plants where expansion has been rapid and many men are now learning to be superintendents, foremen, or lead men, such training, especially in the fundamentals of leadership, is highly important. The discussion of this important subject is beyond the scope of this article, but it is recommended that those who are interested contact their local Training Within Industry office of the War Manpower Commission for advice.



Journeyman checking compound bend prepared by student

Instructor demonstrating cutaway view of reciprocating pump to student

Light-weight pipe with two-bolt couplings laid on surface for a gathering system in Montague County, Texas. Pipe was strung by manpower and laid through timber where no right-of-way was cleared

Light-Weight, Bolted-Coupling Construction Tested by Stanolind

by Paul Reed

A test of laying light-weight pipe with two-bolt couplings on the surface of the ground for a gathering line demonstrates that a type of construction, similar to that of military portable pipe lines, halves laying costs and makes it possible to conserve steel since half the tonnage is required for the footage of the line. Such a line can be cheaply removed when oil-production conditions change or it can be left in service for the life of the pool.

TO solve a wartime problem, Stanolind Pipe Line Co. is departing from established practice under certain conditions by laying thin-walled pipe, joined with two-bolt couplings. Such a line is laid on the surface of the ground in localities where this type of construction is advantageous for gathering-line service.

This type of line, similar to portable pipe lines used by the Army, is useful for meeting a combination of circumstances. Among these is the one resulting from the growing demand for crude oil which faces pipe lines with the prospect of seeking a larger number of connections from wildcat wells or new pools with doubtful reserves. This type of economical construction minimizes financial risks involved, and conserves the available steel for pipe lines which is limited by government allotments. Reduced manpower required for the procedure is attractive because of the labor shortage.

Application of this type of construction as a test in gathering-line service came as the result of investigations by W. G. Heltzel, vice president of the Stanolind company. From him and from a report prepared by J. C. Stirling, engineer, most of the information in this article was obtained.

For a number of years the company has had experience with bolted couplings on short lines and on the 38-mile Opal-La Barge, Wyo., line of 4-in. standard-weight pipe in 20-ft. joints. Gaskets used with the couplings were made of natural rubber. The 38-mile line in Wyoming was used for high-pressure operations for moving crude oil; part of the time it moved heated oils. About 18 miles of this line were taken up in 1941 at the high-pressure end; the remaining 20 miles of pipe is still in service. The reason for abandoning the 18-mile section was that operation of the line called for pressures up to 1,800 lb. The natural-rubber gaskets had deteriorated and no satisfactory substitutes were available. On the whole the line functioned satisfactorily during 20 years of service.

Within recent months the ability of this kind of coupling to withstand severe service has been thoroughly tested by portable-pipe-line organizations of the Army.

Results obtained in laying approximately 4 miles of thin-wall pipe with bolted couplings from the Illinois Bend pool in Montague County, Texas, to Stanolind's present system east of Nocona have been sufficiently satisfactory to warrant a further use of this practice.

This line has 19,265 ft. of spiral-welded, 4.3-lb. grooved pipe laid on the surface without expense of either ditching or clearing of right-of-way except in a few places where scrub growth had to be cut to permit stringing. Standard-weight pipe totaling 3,300 ft. was laid at crossings and buried across plowed fields and oil fields.

Rough Right-of-Way

The right-of-way is rough with ravines and a considerable amount of timber. Trucks hauled loads averaging 103 joints, or 4,120 ft., to accessible points from where the pipe was

teamed to the right-of-way. Pipe was carried by men for stringing across areas that wagons could not traverse. Padding with wide boards was necessary to prevent boomer chains from bending or denting the pipe. In laying the line, care was taken to avoid having too much line supported on the edges of rocks which might flatten the pipe wall. Precautions were necessary in loading, unloading and stringing. Each joint was lifted and placed in location without dropping. None of the thin-wall pipe was covered and grading was done only at high points.

A six-man crew was used for coupling the pipe. This crew coupled 1.3 miles of pipe in an 8-hour day, which is considerably more than could be accomplished with the usual methods for laying standard-weight pipe. No bending was done.

The gathering line of light-weight pipe and bolted couplings conforms to the rough contour of the ground. No bending was done. Laying along the fence line facilitates surveying and affords protection

Construction

The flexibility of the light pipe and the deflection in the couplings allows a line of this type to conform reasonably well with the contours of the ground. Couplings afford considerable slack. Creeks and ravines, less than 40 ft. wide, were spanned and supported by cables and crotches. In deep creeks or ravines, wooden crotches were replaced by pipe supports. Most of the joints were 40 ft. Twenty-foot joints were used where increased flexibility was needed.

Piping prefabricated at the company's Tulsa shop was installed at the junction of the 4-in. line from Illinois Bend with the Bulcher-Nocona 6-in. line.

At Illinois Bend a pumping unit was installed, having a reciprocating pump with 2½ by 10-in. plungers, driven by a 30-hp. engine.

At the head of the fluid steam when filling the line, a scraper with synthetic-rubber cups was used to push air from the line, which escaped through a loose blind flange and partly open 4-in. valve at the junction. Normal operating pressure is 575 to 590 lb. for delivering 50 to 55 bbl. per hour. The line was tested first with 600 lb.

In the 4-in. line from the Illinois Bend pool seven leaks developed. One of these was in a screw coupling of the standard-weight pipe; six were in the bolted couplings. Five of the leaks at bolted couplings occurred because the rubber gasket was pinched between the ends of the pipe. The other was the result of installing a gasket without proper cleaning. The fact that the laying crew was getting its first experience in the installation of bolted couplings probably accounts for most of this trouble. The leaks were located and corrected within a short time. After all leaks were corrected the line withstood a pressure of 800 lb.

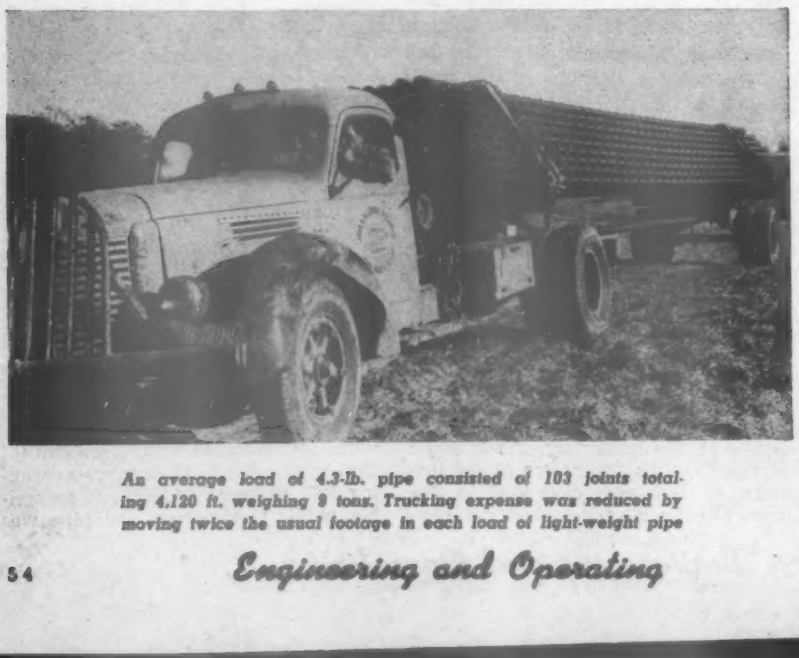
Lower Laying Cost

Cost of laying the light-weight pipe was about 6 cents per foot, including work connected with right-of-way, hauling, stringing, laying, supports, repair of fences, and engineering. This is considerably less than the cost of laying a 4-in. standard pipe in the conventional manner. Laying of 2,340 ft. of 11-lb. standard-weight pipe, across plowed fields and in the oil field, cost about 18 cents per foot. In addition, 955 ft. of standard-weight pipe was laid at three overhead, two underground creek crossings, and five road crossings.

The company's experience indicates that the labor cost of 6 cents per foot for stringing and laying 4.3-lb. pipe with bolted couplings on the surface is approximately 50 per cent of that for laying standard-weight pipe above ground. Ditching cost is saved.

It is anticipated that, for the light-pipe construction described, a more devious route requiring a somewhat longer line may be desirable to avoid cultivated fields and to benefit from the advantages of laying along fences. By laying close to a fence, protection of pipe from damage by vehicles is assured. Surveying and stringing are usually facilitated and the expenses of procuring right-of-way easement and for damages are reduced to a minimum.

The advantages of this type of line laid at half the usual labor cost and with twice the usual footage per ton of steel are beneficial for the economics of gathering-system operations. Such lines can be cheaply removed when oil-production conditions change or they can be left in service for the life of the pool.



An average load of 4.3-lb. pipe consisted of 103 joints totaling 4,120 ft. weighing 9 tons. Trucking expense was reduced by moving twice the usual footage in each load of light-weight pipe

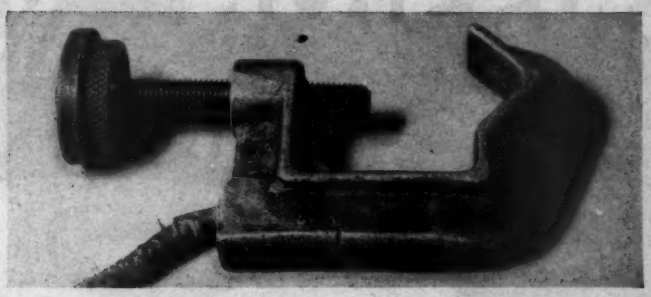
PLANT PRACTICES

Caps Protect Tank-Car Pop Valves

THESE reinforced waterproof paper caps are tied over the pop valves on tank cars to prevent dirt or other foreign matter from entering the tank and contaminating the contents. This is particularly desirable when the car is used for furnace oil.

Safety for Sledge Hammers

VICIOUS cuts and injuries are received by workmen when hammering heavy work with sledges, caused by loosening of chips of steel under powerful blows, which chips fly off to strike legs, feet, eyes, etc. A simple method for preventing these chips from flying at random and high velocity is that shown in the illustration. A heavy rubber strap, cut from any suitable tubing of diameter considerably smaller than the head of the sledge, is stretched around the sledge head so that it extends a fraction of an inch beyond the level of the face. Its natural tensions will pull its edge in against the sledge face and will retain any splinters or chips when they are broken off. Mortality among these rubber sleeves is high, but their replacement is cheap.



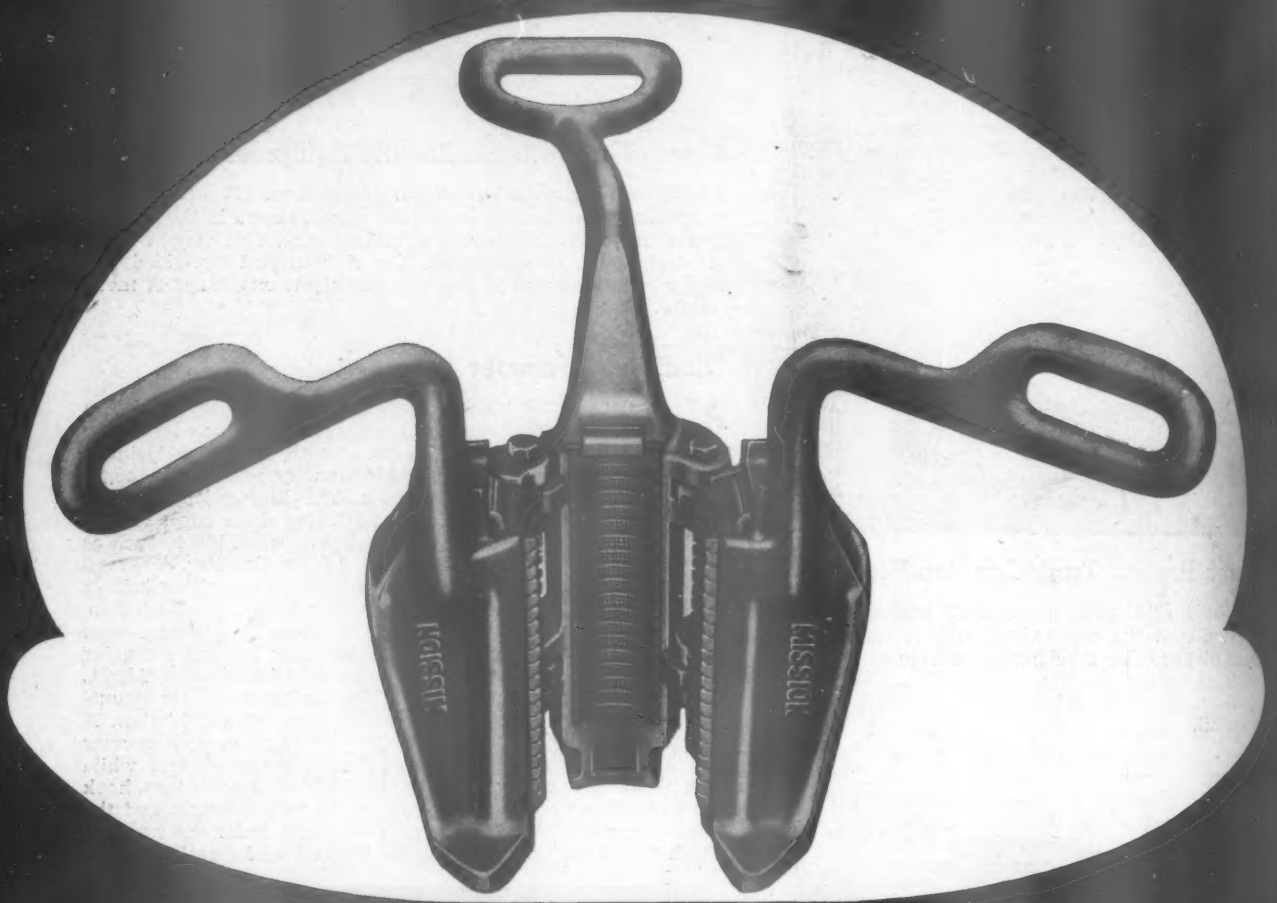
Grounding Portable Electric Equipment

PORTABLE electric equipment operated on 110 volts may be quickly grounded by the special clamp, shown in the illustration, attached to the end of the ground wire. This may be made of steel, brass, or aluminum. The right-angled two-sided jaw enables the workman to clamp it quickly to any shape of metal fixture.

"Scarfing" Hammer

AT points in tank walls or in steel-fabricated equipment of any kind where three or more sheet corners or edges come together the problem of making a smooth, fluid-tight joint is troublesome. To simplify the problem one or more of the edges is hammered out to a feather-edge. The illustration shows a novel way to build a hammer for flattening these edges or corners. The base of this assembly is a heavy wood block, such as a section of a tree trunk, 2½ ft. high, 2 ft. in diameter. A curved ½-in. sheet is bolted to the side of this block, extending 2 ft. or more above it. Atop the block is placed a heavy steel slab 2 in. thick or more, as an anvil, secured in place. Two arms extend upward from the top of the ½-in. sheet, for holding a regular air hammer fitted with a scarfing head. A series of pairs of holes at required intervals are drilled in the upright arms, for mounting the hammer at different distances from the anvil below. A foot lever is attached to the hammer air valve in such manner that it may be opened and closed by the operator's foot while both his hands are busy handling the work. By a cable loop, hook or otherwise a sheet is swung up to the proper height and the edges or corners to be feathered are placed under the hammer which "beats out" the metal to the desired conformation.

MISSION "ROLLING DOG" SLIPS



SAVE PIPE.. important all the time.. but vitally so in total war

MISSION ROLLING DOG PRINCIPLE assures full protection for your drill pipe because the rolling dogs give a gradual cushioning grip, instead of cutting or bottlenecking. Drill pipe is critical material. Save it.

Small non-continuous teeth further protect pipe by preventing undue stress concentration.

Faster Round Trips: The positive grip and instant release of these slips results from the action of the Rolling Dogs. This means faster, safer handling of pipe.

USE MISSION ROLLING DOG SLIPS AND PROTECT YOUR DRILL PIPE, CASING, AND TUBING.

You handle pipe faster and safer with Mission *"Rolling Dog"* Slips.

MISSION MANUFACTURING CO.

HUMBLE ROAD, HOUSTON, TEXAS

EXPORT OFFICE: 30 ROCKEFELLER PLAZA, NEW YO

OPERATING IDEAS

Pipe Jack Saves Strain In Racking Drill Pipe

In the racking of drill pipe and casing it is often necessary to move the pipe lengthwise to get them to line up evenly. This is usually accomplished by placing the joint of pipe on a roller and then moving it in the desired direction. Getting the pipe line on the roller is often a little difficult, particularly when the larger and heavier grades of pipe are being handled. Instead of lifting the pipe by hand, or rolling it on to the roller, one crew adapted a car jack to the work. A heavier base and a longer lift rod were

provided. The lifting arm was also remodeled to fit the contour of the pipe. After the pipe has been moved into the exact position by the roller, the jack can be used to lift the pipe slightly so that the roller may be removed and then lower the pipe on to the boards.

Floor Tiedown in Flood Country

OIL-PRODUCING facilities located in regions subjected to flooding require special protection against rising waters. Well-head connections are commonly protected by stockades which prevent debris from damaging the christmas trees. One of the annoyances not ordinarily considered by operators in their first experience in such areas is the loss of derrick floor boards during floods. The steel framing members protect the well connections but the flooring floats and may be washed away. After an experience such as this, one operator with properties near a river prevented a recurrence by nailing an old bailing line to the floor boards and then passing the line under the steel girders and turnbuckling it in place. Lengths of the bailing line were laid across each end of the boards.

Caution Signs Prevent Accidents

MUCH of the beam pumping of oil wells with electric motors is done on a time cycle with automatic controls starting and stopping the pump at predetermined intervals. The natural tendency of the pumper is to perform the maintenance work necessary around the unit while it is not in operation. However, unless he is very careful and has a thorough knowledge of the cycle on which the unit operates, there is danger of its being put into operation by the automatic controls while he is working on it. Accompanying photographs show the warning signs used by two major companies to avoid accidents of this type. Pumpers are warned verbally never to work on the unit or the well unless the switch is in the off position and the signs act as reminders.

Front Lines in REFINING

by Arch L. Foster

Organizing a Nation's Technologists

ONE of the outstanding single examples of voluntary association and organization of technology for an emergency job is that given by the Coordinating Research Council. Correlating the work of 150 groups or committees, including probably 10 times that many men from every petroleum and automotive laboratory in the country and collaborating with British technologists, this organization is guiding and carrying out every phase of fuels and lubricants research required by our armed forces. One fuels group alone has made and used more than 100,000 gal. of special test fuels in making their own group of research projects. In one month 80,000 copies of two report forms for reporting results of aviation gasoline tests were distributed. The data so reported are studied, correlated and summarized, and from the knowledge gained by the research, in each voluntary collaborating laboratory, plan for continuing the project is made, implemented and pursued in the same manner.

One of the more recent jobs carried through is that of training more than 200 operators for making the extremely difficult determinations of octane ratings for 100-octane-number fuels. This test, using a supercharged test engine is far more difficult, we are told, than earlier tests for either aviation or motor fuels. Still other operators will be trained to bring up to the required expertness the testing staff of the nation's fuel laboratories.

Solves Common Problems

The idea of the C.R.C. grew out of cooperative work done during World War I, inspired by Henry L. Doherty and Harry L. Horning. First called the Cooperative Fuel Research Committee it correlated the work of oil and engine laboratories in peacetime, was expanded to its present size and form, and now correlates, in its 12 men and their cooperators, the greatest amount of primary search ever attempted by any group of men. "The C.R.C. will continue to honor two fundamental principles," says C. B. Veal, manager-secretary. "This organization has never been and never should become static . . . It must draw only on voluntary service." And for the second principle, "As long as problems exist in the adaptation of fuels and lubricants to equipment, powered by internal-combustion engines, and such equipment to fuels and lubricants, C.R.C. has a vital mission."

Studying the Economic Fuel

A more or less new idea is advanced by Veal as indicating a new goal for the fuel refiner and his purpose in research. The objective of research, he says, should be to determine the type of fuel that, taking into consideration availability, refining costs, and first and maintenance costs of equipment will result for the ultimate user the greatest number of ton-miles per gallon of crude oil consumed or in satisfactory transportation per dollar expended, rather than merely the greatest number of miles per gallon of gasoline.

Nazi Hydrogen-Oxygen-Steam Engine Powers Submarines

THE Nazis will not lose the war for lack of mechanical ingenuity or outstanding technical ability. In the new Erren submarine in use by the German navy, diesel engines are installed which operate on two distinctly different fuels, one for surface operations and one when submerged.

On the surface and with open exhaust lines, the Erren engine operates in the conventional manner, on oil fuel and air, as is the case with all submersible craft since time immemorial. The conventional design includes heavy storage batteries in the U-boat, charged by dynamos driven by the diesels when operating on the surface, and which batteries drive the propellers when the boat is submerged. Now the Germans have done away with these batteries and the driving motors; their crews do not run the potential hazard of being asphyxiated by fumes generated from the batteries in case of malfunctioning.

Under water these engines are equipped to operate on a mixture of hydrogen and oxygen, generating the familiar oxy-hydrogen flame which becomes an explosion under these conditions, mixed with saturated steam generated by previous explosions of this fuel. The oxygen and hydrogen are generated electrolytically from seawater by an electrolytic cell operated by a generator driven by the diesel engines, electrolyzing the water and storing the oxygen and hydrogen and in the proportions found in water—two volumes of hydrogen to one volume of oxygen—at 3,000-5,000 lb. per sq. in. in light, high-pressure cylinders along the boat's keel.

15,000-Mile Cruising Radius

In operation under water, amounts of hydrogen and oxygen in the 2:1 ratio are charged to the cylinders separately, without air; steam from burned gases of previous strokes is admitted to fully charge the cylinders and the mixture is fired by spark as in a gasoline engine. The explosion of the oxy-hydrogen mixture heats the combustion vapors — water vapor — and the steam already present, which expands in the conventional manner of a steam engine. The burned gases from this stroke, which consist entirely of water vapor or steam, pass into the closed exhaust to be used in later strokes in a similar manner. It is stated (Chemical Age, vol. 48, p. 559, May 22, 1943) that this elimination of batteries permits strengthening of the hull so that the submarine may descend to depths of 600 ft., far below any depth charge's effectiveness. Cruising radius is extended beyond 15,000 miles.

Adaptation of the Erren principle to tests in England showed a high increase in efficiency when operating a bus diesel engine at a 10:1 compression ratio.

By such a process, theoretically at least, two additions of power are obtained. In one the explosion of the two gases raises the pressure of those gases suddenly, forcing the piston to travel and to rotate the crankshaft; the heat generated superheats the steam which also applies a sudden increase of pressure to the piston and increasing the power applied to the piston. The fact which has not been reported as yet is what are the net thermal and material efficiencies of this system over the conventional steam engine or internal-combusion engine?

PROGRESS IN METALS

by W. L. Nelson

Inhibiting of Caustic Embrittlement

FROM the results of more than 900 plant tests a satisfactory method has been developed to prevent embrittlement cracking by means of an embrittlement detector, an arrangement that establishes under a test specimen the conditions that may cause embrittlement cracking in riveted seams, i.e., boiler water concentrated in contact with highly stressed metal. It is attached to the boiler and exposes the specimen to the boiler water in the same manner as a riveted seam may be exposed under operating conditions. The table gives an over-all summary of the plant tests with the embrittlement detector.

Embrittlement cracking in a test specimen is invariably caused by an unsafe boiler water, but absence of cracking may be due to improper operation of the apparatus. Sodium nitrate is relatively inexpensive compared with quebracho extract and phosphate but, unlike these other substances, it does not affect the character of the precipitated solids and would, therefore, not help to prevent formation of scale. Furthermore, its usefulness is not as yet determined beyond 400 lb. per sq. in., as compared to 700 lb. per sq. in. for quebracho and at least 800 lb. per sq. in. for the treatment producing zero-caustic alkalinity. The lignin compounds are inexpensive but inferior to nitrate and quebracho, which have largely replaced the former.

Sodium nitrate and quebracho extract have stopped the embrittlement cracking of highly stressed steel specimens in embrittlement detectors on operating boilers. The maintenance of definite ratios of concentration of these chemicals to the concentration of total alkalinity was required. By reducing the concentrations of caustic to approximately zero, the need for an inhibitor was eliminated. Sodium phosphate alkalinity was successfully substituted for caustic alkalinity to achieve this purpose.

Principal inhibitor present—	Specimens not cracked	Ratio recommended inhibitor/total alkalinity	Specimens cracked, ratio maintained	Approximate useful pressure range (lb. per sq. in.)
Sodium nitrate	117	0.3	0	.....
Sodium nitrate	88	0.4	1	.....
Quebracho extract	109	0.4	5	to 400
Waste sulfite liquor	60	0.4	12	to 400
Zero caustic alkalinity	8	caustic 0-8 p.p.m.	0	to 700
Miscellaneous	19	...	...	to 250
No known inhibitor present in sufficient quantity	184	...	286	to 800

Abstract: Berk & Schroeder, Trans. A.S.M.E., Vol. 65, Aug. 1943, p. 701-711. Taken from Dec. 1943 issue of Metals & Alloys.

Position of Steel, Plastics And Light Metals

THE enormous increase in the production of aluminum alloys brought about by the war and the continual advance in the manufacture of plastic materials, invite question as to the effect of these developments on the steel industry. The menace to the steel industry can be more clearly seen in its true magnitude by a comparison of the approximate production capacity of these materials.

APPROXIMATE YEARLY PRODUCTION CAPACITY

	Tons
Steel	100,000,000
Aluminum	1,500,000
Magnesium	300,000
Plastics (estimate)	280,000

Such quantities can scarcely be of alarm to the steel industry although inroads of even 1 or 2 per cent cannot be ignored, particularly should postwar steel production decrease to 50 or 60 million tons.

The logical outlet for aluminum and magnesium alloys lies in the transportation industries. In these, the advantage of light weight is a pyramiding type of advantage by which decreases in weight result in additional decreases in weight among auxiliary parts of equipment. This may be illustrated by the use of a light-alloy automobile frame. The initial decrease in weight allows lighter tires, brakes, engine, etc., which in turn permits an even lighter frame, and so on until a final balance is established at some low weight. Thus, light alloys will be used for aircraft, automotive equipment and railroad cars. These are big industries but quite definite advances into these industries will be necessary if the new light-metal industries are to be kept busy. A production of 6,000,000 automotive units per year might utilize more than 600,000 tons, aircraft might employ another 200,000 tons, and the replacement of freight or passenger cars in the railroad industry to the extent of 50,000 cars per year would hardly require the remaining production of the aluminum industry. It would seem that the difficulties of the new aluminum industry will be greater than the difficulties of the steel industry. The use of light alloys for structures will probably not be large except perhaps for walkways, stairs, ladders, etc., which are designed more for stiffness than for strength.

Plastics can be used for a large number of small objects. They have inherent advantages for many purposes, such as color, chemical stability, appearance, insulating properties, etc. For these reasons the application of plastics will probably proceed without great interference to the metal industries. Large-scale applications, such as the use of plastics for shingles or for low-temperature pipe lines may be developed but such applications would eventually require a vast expansion of the now somewhat small plastics industry.

Alloy Iron Pump For Salt Water

A 1.6 PER CENT nickel-iron centrifugal pump casing with monel metals seal rings and impeller has been pumping salt water since August 1937, except that the packing rings were once built up by welding. A plain iron pump with bronze impeller was installed at the same time (and in same service). The plain iron casing was destroyed in less than 17 months, and a second casing has been destroyed since the original installation was made in 1937. The original bronze impeller had to be removed after 4 years of service. The performance of these pumps is described in Nickel Cast Iron News, Vol. 14, No. 3 of International Nickel Co., Inc.

Oil-Well Pumping Practices—No. 29

Locating and Balancing of Central Pumping Powers

by J. Zaba

Efficient operation of a central pumping power is dependent among other things upon correct location and proper balancing of the power. Location of the power is governed by a number of variable factors. Balancing involves careful calculation of loads under different conditions. Methods for selecting the correct location and procedure in balancing a power are discussed.

FOR a property with a large number of shallow wells with small, settled production, central pumping powers were, and still are, a generally accepted method of pumping. By centralizing the power plant and the transmission system in one location, they offer, for conditions under which the method is applicable, a saving over a unit-pumping system, both in investment and in the operating expense. The saving in investment is, of course, the result of reduction of number of prime movers and transmission systems needed. The saving in operating expense affects all the component parts of this expense, that is the labor, maintenance, power or fuel and other miscellaneous costs.

With the problems of rod-line systems, from the well to the knock-off posts, presented in the preceding installments of this series, the discussion of central pumping powers reduces itself to the discussion of the power itself. All the central powers can be divided into two groups: the bandwheel powers and the geared powers. Each of the two groups is represented by many different types amply described in literature of manufacturers. The mechanical details of construction and the problems of transmission are beyond the scope of this discussion. From the standpoint of the operator, once the power has been selected, the two main problems affecting the power itself are first, proper location of the power, and second, proper balancing of the power.

Location of Power

If the central power is located correctly in regard to the wells it is to serve, the problem of keeping the power in proper balance is considerably simplified. Correct location of the power eliminates excessive one-sided loads and makes unnecessary complicated arrangement of rod lines which would be required for equalizing of the distorted torques. In other words, proper location of pumping power is an important factor contributing to the power's satisfactory operation. Of course in many cases the pumping power cannot be located in the mechanically most desirable location. Other factors which govern the locating of power are topography, shape of the property, drainage, accessibility, etc., and in many cases they are the deciding factors. Effort, however, should be made to locate the power as close as possible to the mechanically correct position.

An approximate method of selecting location for central pumping powers is used quite commonly and with satisfactory results.[1,2] The lease and the well locations are drawn to scale on a stiff cardboard. Holes are then punched in the cardboard for each location and weighted strings are passed through each hole. The weights, attached to the strings, are either of equal weight or, in case dynamometer data are available on the wells, are proportional to the weight of wells. The center of gravity of the cardboard, determined by trial and error until the balance is obtained, is the approximately satisfactory location of the power. A graphic method of determining the correct location of central pumping powers has been evolved by Sylvan J. Pirson.[3] The method delineates the area within which the power should be located if satisfactory torque conditions are to be attained.

Balancing of Powers

As in case of unit-pumping installations, correct balancing of central-pumping powers is a prerequisite of satisfactory operation of the installation. Under conditions of unbalanced power, the gears, belts and prime mover carry excessive, uneven loads. This results in rapid deterioration of the equipment. Rod lines are subjected to excessive whip, resulting in wear and tear. Power requirements are much larger than those of a well-balanced central-pumping power. The cumulative effect of these conditions finds its expression in increased cost of maintenance and operation.

There are a number of factors which may affect the balance conditions of central pumping powers during the life of the installation. First, the balance of a power may be disturbed by adding of new wells, without making proper adjustment of balancing arrangements. The addition of new wells may occur in two ways. The power may be installed on a property on which some of the wells are still flowing. In such a case the power would be designed for the ultimate number of wells it is to operate and the balance conditions during the transition period would change as new wells are added to power. Or, a settled property, with mechanically lifted production, may receive new pumpers as result of a new drilling campaign which was not planned at the time the power was installed. In such a case careful consideration of new balance conditions is even more important than in the case where the power was originally designed for all the wells it is to serve. Second, the balance of a central power may be disturbed by changing weight characteristics, during the producing life of individual wells of a settled property. Periodic checks of balance conditions are the only remedy if satisfactory operations are to be maintained.

Methods Follow a Pattern

There are a number of methods of determining the balance conditions of a central power. Most of these methods follow a certain pattern which can be summarized as follows: The first step is determination of forces acting on the power. This is done either by measuring of loads with pull-rod dynamometer, at the power, or by calculation of rod-line pull, as discussed by Installment 26 of this series. The second step is arriving at the effect of these forces on the power. This is done most conveniently by graphic methods. Depending on method used such analysis furnishes the picture of the existing load, balance effect or torque conditions. The third step is determining, from the graphic analysis, the rearrangement of forces which is needed to bring about proper balance conditions. This step includes checking, again by graphic analysis, of the planned corrections to determine whether or not they satisfactorily serve their purpose. In applying the results of analysis the pro-

posed rearrangement of forces is attained by changes in arrangement of rod lines on the eccentrics, by installation of counterbalancing dummies or by changes in pumping schedules.

All the methods of analysis of balance conditions of central-pumping powers include certain identical steps of procedure. Discussion at this point of the steps common to all the methods will eliminate repetition later, when some of the methods are discussed in more detail.

As previously stated, graphic methods are used in analyzing the effect of forces acting on the power. In using these methods the forces are presented as vectors indicating both the direction and the magnitude of the forces. The direction in which the forces are acting is that of the rod lines. The magnitude is presented in any convenient scale. The direction of the rod lines can be determined from the original plot of the installation or, the angles between the rod lines can be turned with a transit.

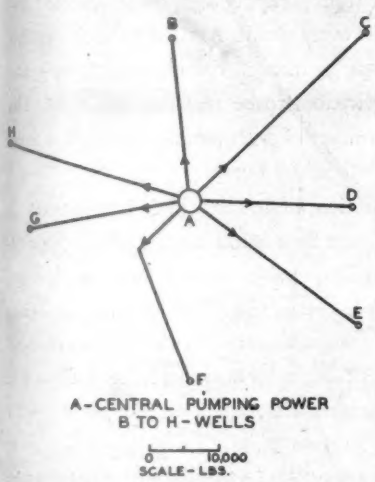


Fig. 1: Vector presentation of forces acting on a pumping power

Fig. 1 illustrates the manner of presentation, using an assumed case.

Finding Torque Conditions

In some of the methods, involving determination and equalization of torques, it is necessary to find the torque conditions for different positions of the crank. Since at any given position of the crank each of the wells operated by the power is in a different phase of its pumping cycle, some means must be found of coordinating the different well loads for each of the crank positions. Different methods accomplish this in a different way, but most of them use as a starting point the dynamometer cards taken on rod lines near the power to arrive at load conditions for different phases of the pumping cycle of a well. A circle is drawn on the zero line of the dynamometer card. The circumference of the circle is divided

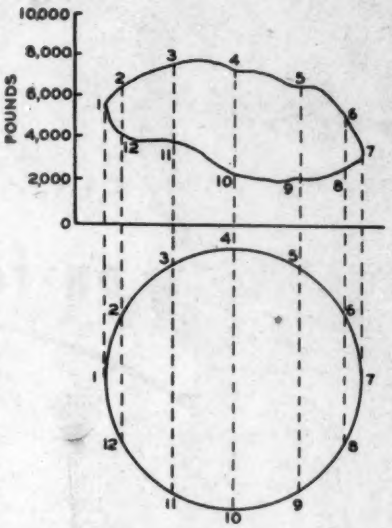


Fig. 2: Correlation of loads with different phases of the pumping cycle

into 30° intervals, and the points of division are projected to the curve of the dynamometer card (Fig. 2). This, for all practical purposes, determines the well loads for different positions of the polished rod. Some of the methods of correlating these loads with different phases of the cycle of the power will be discussed later.

Cases may occur when the dynamometer cards are available on wells for which the pumping power is being planned and it is desired to determine in advance the torque conditions. In such cases, of course, no rod-line dynamometer cards at the power are available. Similarly, in an existing installation, cards may be available on wells, and it may not be convenient to take another set of cards on the rod lines. To determine in such cases, the rod-line pulls at the power the friction loads may be calculated. (0.2 to 0.03 of the physical weight of rods—Installment 25). The magnitude of this friction, if added to upstroke loads and subtracted from the downstroke loads of the well dynamometer card (Installment 26) determines the rod-line pull of the well at the power. A very convenient procedure has been suggested[2] for simplifying the calculations involved in this method of determining the rod-line pull. After the friction load of rod line of a given well has been determined two new zero lines are drawn on the card of the well. Both of them are separated from the dynamometer-card zero line by the amount of calculated friction. The upstroke and downstroke rod line pulls can be scaled off directly from these new zero lines. (Fig. 3).

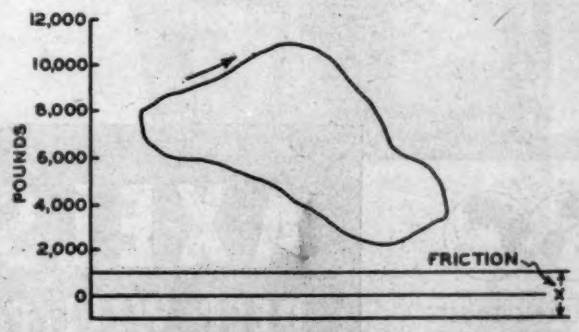


Fig. 3: Rod-line pull at central pumping power from well dynamometer card

As previously stated, the above procedures are used in most of the analyses of balance conditions of central pumping powers. Manner of arriving at final conclusions will be shown for some of the commonly used methods. Sequence of discussion of different methods is entirely arbitrary and should not be construed as suggesting the opinion in regard to their relative merits. No comparisons can be drawn since practically each of the methods serves a slightly different purpose and furnishes slightly different information.

Analysis of Central Power Balance

Method No. 1.—This method was used on properties of one of the major oil companies in the East Texas field.[3] Plot of the power and its rod lines was made and the wells were numbered in a clockwise direction in the order of position their rod lines occupied at the power. The rod-line dynamometer cards were secured at the power and from the cards the counterbalance was determined for each individual well. (Formula for determining the counterbalance from a dynamomter card was given in Installment 20). These average forces needed for balancing of individual wells were scaled on the plot of the rod lines and were added vectorially. The vector closing the diagram represented the magnitude and direction of the resultant force which was needed for balancing of the power. As a further step in this analysis torque and horsepower conditions were also determined. The procedure for such analysis will be given in conjunction with discussion of other methods.

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3. George Weber: "Improved Pumping Operations in Central Power Units."—The Oil and Gas Journal, March 14, 1940, p. 45.

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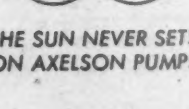

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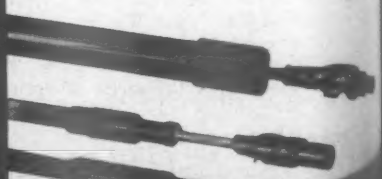

COST RECORDS—RECONDITIONING

ANY type of well-reconditioning work necessarily involves the accumulation and subsequent analysis of considerable cost data. These data may take various forms and are handled somewhat differently by each operator. However, such analyses can generally be divided into three phases:

1. Pertinent well data, estimated costs and estimated increase in profits at the time the recommendations are made.

2. Day-to-day records or periodic summaries showing the payout status of the reconditioning work.

3. A final analysis when the cost data are complete and the status of the job has been definitely determined.

Recommendations for Workover

Recommendations for workover jobs are made for various reasons. Lease production records may show a substantial decrease and a routine check is made to determine the reason. If the decline appears abnormal and the trouble is not due to equipment failures, some type of workover job may be necessary. The advisability of reconditioning work may also be indicated by successful jobs at similar wells in the same locality. In some instances a well may be operating on a small margin of profit and reconditioning work is undertaken in an effort to shift this well into the profitable class of operations. Other types of workover jobs may be strictly experimental and are recommended for the purpose of securing information.

In any event most operators consider the accumulation of all pertinent well data and estimated costs to be necessary before this type of work is done. Quite apart from the economic advisability of attempting such work, the success of the job often depends upon a thorough preliminary study of all of these data.

Recommendations usually are accompanied by cost estimates of the job under consideration. Since a great deal of uncertainty is involved in many types of reconditioning work, the possibility of increased expense, due to unexpected difficulties, should be given careful consideration. As an example, one operator recently reported that the cost of a plug-back operation at one well was 600 per cent greater than the anticipated expenditure. Such increased expenditures are a common occurrence where cable-tool or rotary rigs are necessary to perform the work and where unforeseen troubles arise.

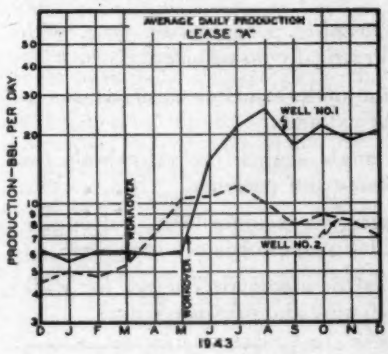

Fig. 1

Summary of Jobs Performed

After the workover job has been performed, cost data and production figures are recorded and periodic summaries may be prepared which show the production and payout status at each individual well. Production both before and after the workover job can be conveniently recorded on semilogarithmic charts as shown in Fig. 1.

The periodic summary of workover jobs is illustrated in Table 1. These statements may be prepared in a number of different forms according to the information which is to be presented. Such abbreviated summaries are of extreme value, particularly to executives who wish to know the results of these workover jobs from an economic standpoint and who do not have sufficient time to analyze all of the detailed technical data.

In addition to the data shown in Table 1, another column might be included to show any increase or decrease in repair expense which may be attributed to the workover job. This is of particular interest, for instance, where the workover job was done in an effort to reduce repair expense.

TABLE 1—MONTHLY REPORT—STATUS OF WORKOVER OPERATIONS

Well	Date	Type of job	Cost of job	Daily prod. Before	Daily prod. After	Payout status 1-1-44
"A"	10- 1-43	Cleanout	$815	75	112	+$2,330
"B"	8- 2-43	Water shutoff	720	45	48	—618
"C"	10-11-43	Acidize	460	15	29	+443
"D"	8- 5-43	Bail	650	24	38	+1,480
"E"	7-25-43	Shoot	1,100	3	18	+1,060
"F"	10- 2-43	Drill deeper	4,200	2	69	+1,930
"G"	11- 8-43	Plug-back	2,400	0	121	+4,120

Calculation of Payout Status

An example of a common method for calculating the payout status of the workover job is shown in Table 2. In this table the net production increase is the increase in gross production less one-eighth royalty. The value of this increase was computed on the basis of $1.10 per barrel of oil.

In calculating the expense items which are charged against the increased revenue—the cost of the workover job, production lost during the job, and any increase or decrease in operating expense, are all taken into consideration. A final report embodying a cost analysis in essentially the same form as that illustrated in the accompanying tables may be made before the well is dropped from the summary.

TABLE 2—EXAMPLE—CALCULATION OF PAYOUT STATUS—WELL "C"

Revenue	
Increase in gross production, bbl. (10-11-43 to 1-1-43)	1,135
Increase in net production, bbl. (seven-eighths of the gross)	992
Value—net production increase ($1.10 per barrel)	$1,090
Less gross production tax (5 per cent)	55
Increased profit from reconditioning	$1,035
Expense	
Cost of reconditioning job	$400
Lost production during job	63
Increased operating expense	69
Total expense due to job	$592
Payout status or net profit from job (1-1-43)	$443

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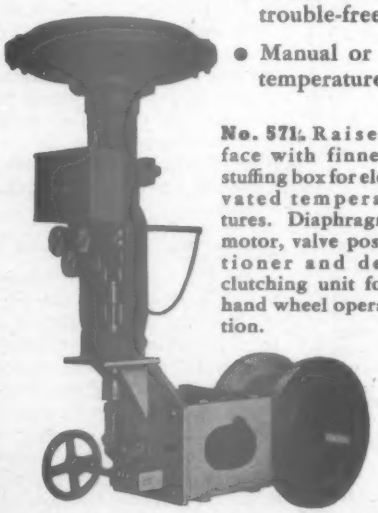

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Engineering Fundamentals

No. 128

A FEATURE OF THE OIL AND GAS JOURNAL

INTERPRETING FILTER-TEST RESULTS

DATA from mud-filter tests in which temperature and pressure are held constant yield a substantially straight line when the filtrate volume is plotted against the square root of time. In like manner, if the square of the filtrate volume is plotted against time, a straight line should be obtained. This method of plotting is recommended, though, because the filter-test procedure is of such nature that an unavoidable error in reading the volume of filtrate usually occurs at the start of the test. This error may be in the form of either a loss or a gain. If the square of the volume of filtrate is plotted against time, this initial error will distort the straight line into a curve, which makes accurate extrapolation difficult. On the other hand, if the volume of filtrate is plotted against the square root of time, a straight line will result regardless of any constant error in the filtrate volume, and any such error can be easily determined by reading the intercept of the straight line on the filtrate-volume axis.

Graph paper, lined to give regular spacing along the ordinate for plotting filtrate volume and a square-root scale along the abscissa for plotting time, is generally used for showing the filter-test results.

This graphical representation allows one to average all readings by drawing a straight line through several points. The straight line may be used also for approximating the volume of filtrate that should be obtained at any time greater than the length of the actual test period.

The viscosity of water at various temperatures is given in Table 1. The volume of filtrate at any given time varies inversely as the square root of the viscosity of the filtrate. Some muds lose more water at elevated temperatures than that indicated by this simple mathematical relation. It is believed that this additional filtration is caused usually by the flocculation of the clay colloid at the higher temperature; although, in dealing with a chemically treated mud, the filtration may be influenced by other effects (breakdown of deflocculating agent, for example).

Since the wall-building properties of a mud at an elevated temperature may be worse than would be predicted from a filter test taken at a lower temperature, one should be cautious in applying the results of a filter test at room temperature to a well condition in which the bottom-hole temperature is considerably higher than room temperature.

TABLE 1—VISCOSITY OF WATER AT VARIOUS TEMPERATURES*

Temp., °F.	Viscosity, centipoises	Temp., °F.	Viscosity, centipoises
50	1.310	140	.470
60	1.129	150	.433
70	.982	160	.401
80	.862	170	.372
90	.764	180	.347
100	.682	190	.325
110	.616	200	.305
120	.559	210	.287
130	.511		

*From Badger and McCabe, "Elements of Chemical Engineering," McGraw-Hill, 1936.

Mathematical analysis based on the assumption that the filter cake is noncompressible indicates that the volume of filtrate should vary directly with the square root of the differential pressure across the cake. It has been found that actually a filter cake is compressible to some degree, which causes the filter cake to be somewhat less permeable at higher differential pressures. As a result, the water loss at higher pressures is less than that indicated by the relationship just given. Tests have shown that the water loss usually varies directly with the differential pressure raised to some fractional power less than one-half. Tests using certain types of bentonite showed that there was no substantial change in filtration rate as the pressure was varied.

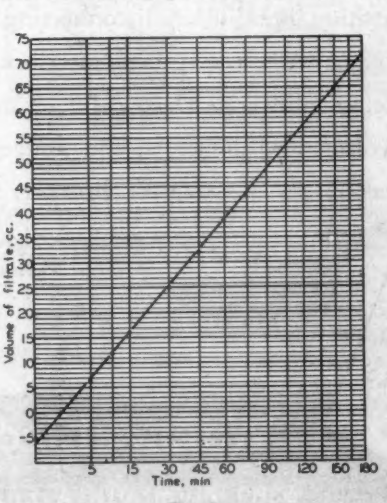

Fig. 1

The essential independence of filtration rate and differential pressure in dealing with such a bentonitic mud is probably due to the plate-like shape of the bentonite particles; such shape causing them to fit together more perfectly and form a cake of proportionately lower permeability as the pressure against them is increased.

For any given mud, filtration tests made at various differential pressures will allow plotting of filtrate volume against differential pressure on log-log paper. Such a plotting will yield essentially a straight line, which may be extended and used for estimating the behavior of the mud under either higher or intermediate differential pressures.

Illustrative Example

Problem.—The following data were recorded during a wall-building test:

Time, min.	Volume of filtrate, cc.
5	6.5
10	12.0
15	16.0
30	25.0
45	32.0
60	38.5

Differential pressure across filter cake, pounds per square inch = 100.

Temperature of test, °F. = 70.

Cage thickness at end of 1-hour test, inch = 7/32.

Plot the results of this test and determine for a 3-hour test at 150° F. and with a differential pressure of 100 lb. per sq. in. the following factors:

1. Volume of total filtrate, cc.
2. Cake thickness to nearest 1/32 in.

Solution.—The results of the test are plotted in Fig. 1. Note that the intercept on the vertical axis shows an initial loss of filtrate equal to 6 cc.

1. By extending the straight line to the 180-minute time axis, the volume of water loss at the end of 3 hours is read from the curve to be 715 cc. Adding on the initial loss, the total water loss is 77.5 cc.

For a 3-hour test and a temperature of 150° F., the water loss should be $77.5 \times \sqrt{0.982/0.433}$ or 117 cc. Actually the water loss would probably be a little higher than this amount at 150° F., because of flocculation of the mud at the higher temperature.

2. Cage thickness varies directly with the water loss, so the expected cake thickness for the 3-hour test at 150° F. is $7 \times 117/44.5$ or 18/32 in.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

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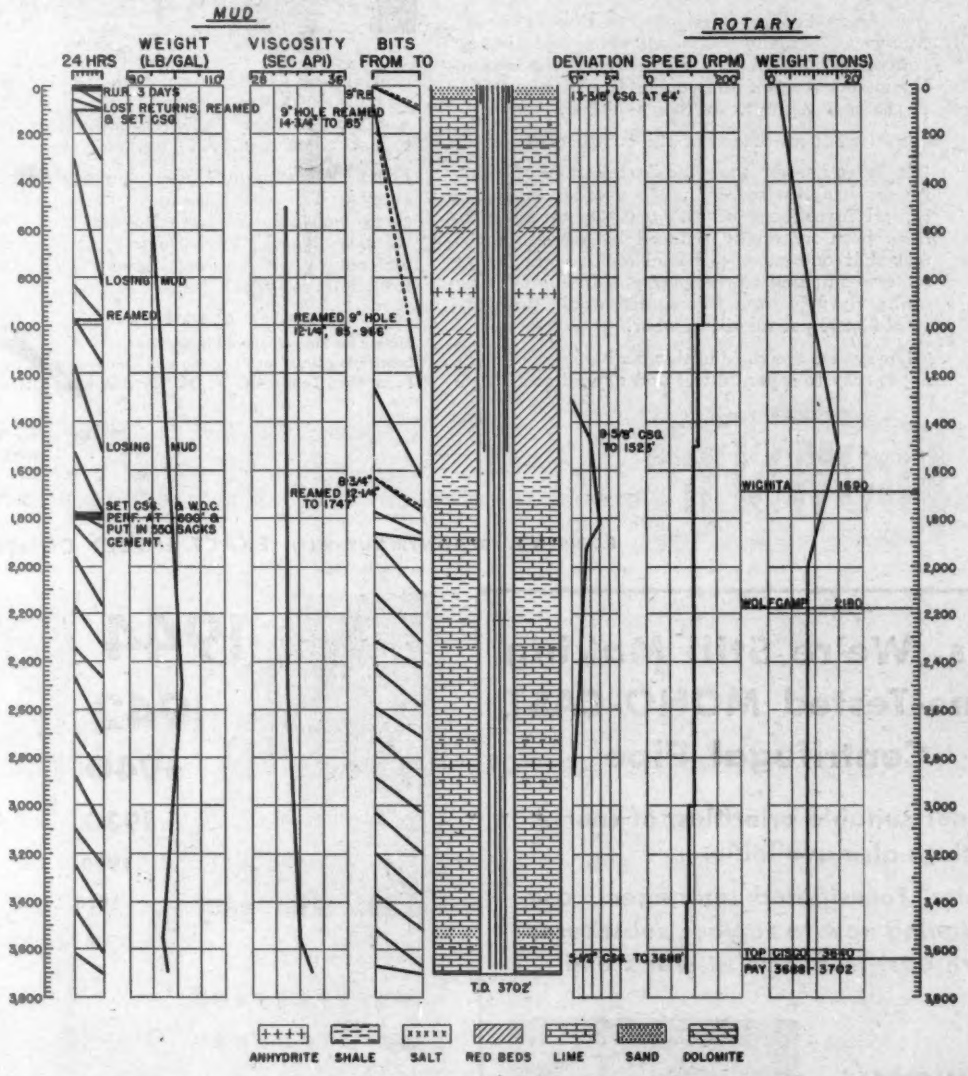

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	Days
Rigging up rotary	4.0
Logging (electric)	0.8
Drill-stem and Syfo tests	1.0
Breaking down pipe, running casing, W.O.C.	7.7
Trips	2.0
Repairs	0.9
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Days drilling	14.8
Completing	2.7
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Total rotary time	34.3

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Electric log to 3,702 ft.; acidized with 4,000 gal. in two stages to open hole 3,688 to 3,702 ft.

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9⅝	36.0	1,523	1,285
5½	15.5	3,688	125
2	...	3,688	...

MUD USED

Type—	Amount (lb.)
Boroco	9,000
Aquagel	3,100
Zeogel	2,500
Cotton seed hulls	400
Jelflake	100
Paper bags (200)	...

ROCK BITS USED

Number	Size (in.)
1	14¾
3	12¼
2	9
15	6¾

PRODUCTION TEST

Time flowed (hr.)	24
Surface choke (in.)	¾
Tubing pressure (lb.)	65
Casing pressure (lb.)	50
Oil (bbl.)	361
Gas (cu. ft.)	58,000
Gas-oil ratio	161
Gravity	33.1
Bottom-hole pressure (lb.)	1,605
Bottom-hole temperature, °F.	98

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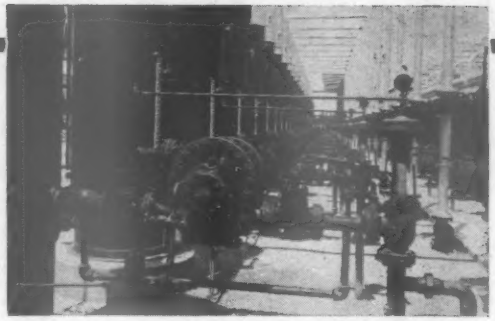

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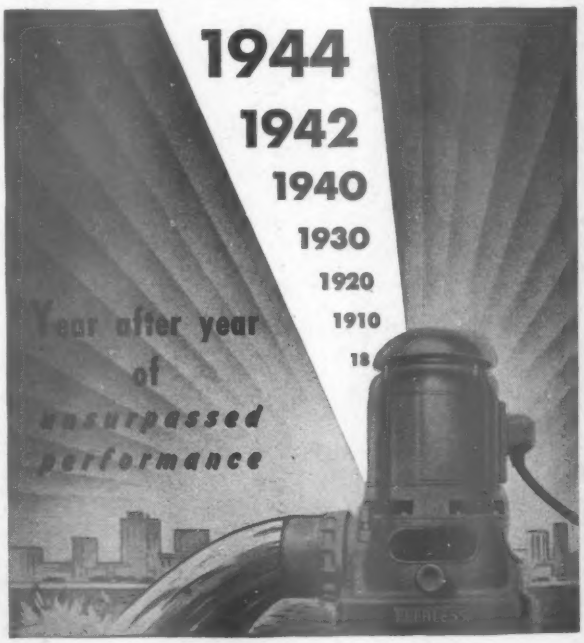

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REFINING

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The aviation gasoline plant of the Root Petroleum Co. at El Dorado, Ark., started operating in late February. The plant which was designed and built by the Frick-Reid Supply Corp. is operated in connection with the 12,000-bbl. refinery of the Root company at El Dorado.

The aviation plant is a complete unit for the manufacture of 100-octane gasoline. Its principal processing equipment includes fluid catalytic cracking, HF alkylation and isomerization with additional power-plant facilities. Other features include a vapor-recovery system, Girdler treating for the removal of H_2S from propane and caustic treating for removal of sulfur compounds from gasolines. The plant is owned by the Defense Plant Corp.

OPA Announces Changes in Asphalt Ceiling Rules

WASHINGTON, D. C.—Changes in the regulations establishing ceilings for asphalt and asphalt products have been announced by Office of Price Administration. None will increase prices to consumers. The principal changes are: (1) St. Paul and Minneapolis, Minn., are made a new reference point (the base for the ceiling) for sales in those cities; (2) a new ceiling price is established for light saturants when sold by refiners in the California area; (3) ceilings for roofing manufacturers who purchase oxidized asphalt in bulk and package it for resale will be determined by a new formula; (4) resellers other than producers or roofing manufacturers may use higher markups under certain conditions.

Industrial naphthas and solvents have been removed from Maximum Price Regulation 88 and placed under Regulation 510. No change in ceilings from those previously established will result.

Refiners to Hold One-Day Convention in St. Louis

A 1-day business session, similar to that of 1943, will be held by Western Petroleum Refiners Association in the Jefferson Hotel, St. Louis, Mo., on March 28.

W. W. Vandeveer, director Petroleum Administration for War, District 2, will talk on "Crude for Midwestern Refiners." Paul G. Ryan, chairman of the committee on postwar planning, Petroleum Industry War Council, will speak on "Petroleum in the Postwar Period." Bruce K. Brown, assistant deputy administrator, PAW, will discuss certain problems in wartime petroleum refining. A fourth speaker will be announced.

Ashland's Aviation-Gasoline Plant Nearing Completion

ASHLAND, Ky.—Ashland Oil & Refining Co. hopes to put in operation within the next 60 days the $12,000,000 aviation-gasoline plant which it is constructing for Defense Plant Corp., according to Paul G. Blazer, president. When the plant is operating at full capacity, approximately 50 per cent of the company's total refinery output will go to government agencies.

American Engineers Install Refineries in U.S.S.R.

WASHINGTON, D. C.—In order to reduce the need for refined fuels from the United States, 145,000 tons of refinery equipment have been sent for installation in the U.S.S.R., according to Leo T. Crowley, foreign economic administrator. American engineers are assisting in the construction of these refineries, which will produce

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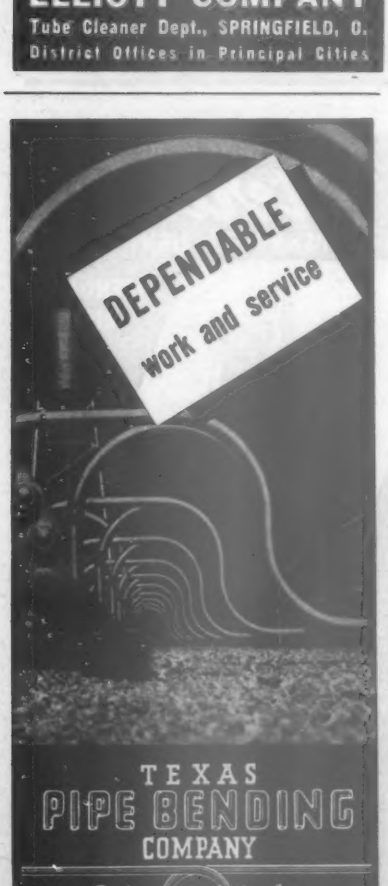

aviation gasoline and other refined products from Russia's oil resources.

Shipments of petroleum products to the Soviet Union up to January 1 included 740,000 tons of aviation gasoline and other refined fuels and lubricating oils needed for the Soviet air force and for the ground fighting on the eastern front.

Mexico to Have High-Octane Refinery With U. S. Help

WASHINGTON, D. C. — An agreement authorizing extension by the Export-Import Bank of a $10,000,000 credit to Mexican Petroleum Co. for construction of a high-octane gasoline refinery at Atzcapotzalco, Mexico, has been signed by United States officials. The loan is to finance purchases in this country of equipment needed to build the plant.

Mexican Petroleum has employed Arthur G. McKee & Co., Cleveland, Ohio, to construct the plant and has retained Phillips Petroleum Co., Bartlesville, Okla., to provide technical advice.

The loan was negotiated with the cooperation of Petroleum Administration for War and contains an option available to any agency of this Government to purchase certain quantities of high-octane gasoline and other petroleum products up to August 1, 1950.

Sketches of Plant Operators

J. C. BRADLEY, superintendent of the Anderson - Prichard Refining Corp. plant at Cyril, Okla., has managed to pack a lot of experience into his 35 years. Born in North Little Rock, Ark., he graduated from high school and had started on a university course when his plans were interrupted and he left school to go to work in Skelly Oil Co.'s refinery at Eldorado, Kans. He was employed in the operating department until 1930, when he was sent to Russia by Winkler-Koch Engineering Co., of Wichita, Kans. He worked in various cracking plants.

Returning to the United States in 1931, young Bradley resumed his school work, and he graduated from Kansas State College with a degree in mechanical engineering. He worked for Globe Oil & Refining Co. in McPherson, Kans., until 1935, when he went to Hamburg, Germany, for Winkler-Koch, helping to start up and operate a complete refinery. Transferred to St. Nåzaire, France, he put into operation a plant owned by Pechelbron Petroleum Co.

Back in this country again in 1936, Bradley rejoined Globe as operator of a cracking plant in McPherson. Later he was promoted to refinery engineer. Another trip to Europe in 1938, when he was sent to Ploesti, Rumania, by Winkler-Koch to help construct and operate a refinery for Columbia, a French concern. He had married Charlotta Praegizer, of Hamburg, and she accompanied him.

WANTED

MECHANICAL ENGINEER

Graduate mechanical engineer with 7-10 years oil refinery engineering experience wanted for development work. Permanent position offered by a long-established AAA-1 company, manufacturing fractionating and pressure vessels, heat exchangers, cast-steel flanged fittings and other equipment for the petroleum and process industries. Knowledge of cast-steel header boxes desirable. Successful applicant will report directly to plant manager. Location in southwestern city where ample housing facilities exist. If you feel qualified for this key position in an expanding organization, apply giving full information and enclosing small photograph. Replies will be held strictly confidential. Maximum salary—$5000 per year.

Box C-183

The Oil and Gas Journal

Tulsa 1, Oklahoma

PIPE LINES

WEP 20-in. Line Delivers Products at Linden, N. J.

The 1,475-mile 20-in. line from Beaumont, Tex., of War Emergency Pipelines, Inc., made its first deliveries of unleaded gasoline at the Linden, N. J., terminus at 3:56 p.m. March 2. The line is now completely filled with heating oil which is being pumped at a rate of 7,000 bbl. per hour with two units in operation at nearly all of the stations. Within a week or 10 days all pumping units will be completed and connected which have been waiting for the arrival of certain items of equipment. However, it will probably be 2 weeks before all units can function because of work for installation of sump pumps. Three grades and possibly four may be transported. So far, announcements have been made only for shipping schedules of heating oil.

Final figures for February show that shipments of crude oil through the 24-in. averaged 310,000 bbl. daily from Longview, Tex., and 305,000 bbl. daily from Norris City, Ill., the difference of 5,000 bbl. daily is represented by crude oil diverted to the Ohio Oil Co. line at its connections for delivery to the East Coast.

Gulf Lets Contract for Looping West Texas Outlet

Contract has been awarded to Sharman & Allen of Houston, Tex., for the laying of five loops on the Gulf Refining Co. pipe-line system from West Texas. The five loops will aggregate 75 miles of 10-in. line which will give the Gulf two 10-in. lines all the way from West Texas to Weatherford, Tex., and will boost the capacity of the system from 70,000 to 80,000 bbl. daily.

Some of the increased capacity will be moved from Weatherford over an 8-in. system to Saltillo, Tex., from where it will be moved to Big Sandy, Tex. At the latter point, an 8-in. line will be laid to Longview to tie into the War Emergency Pipelines, Inc., system. This will provide for delivery of 16,000 bbl. a day of West Texas crude into the big-inch.

The loops include 17 miles from Judkins to Midland, with a 9-in. loop on the discharge side of the latter station. Loops will straddle the Coahoma and Roscoe stations, which will lift the capacity to a maximum of 90,000 bbl. daily to Sweetwater, Tex. At the latter terminal, the line serves a Gulf refinery.

From Saltillo south to Big Sandy, a 13⅓-mile loop will be laid with 27½ miles of 8-in. line to be constructed to Longview.

The Texas-New Mexico Pipe Line Co. line to the Mabee pool in southeastern Andrews County, Texas, and the Humble Pipe Line Co. extension to the Mascho pool in southern Andrews, have been put in operation.

Reconnaissance Trip to Arabian Project Is Postponed

Departure of a reconnaissance party to study problems of the proposed Arabian pipe line has been postponed until April and possibly indefinitely because of oil-industry opposition to the line which has resulted in special consideration of the project by several government agencies. Objection to the pipe line on the grounds that the government will not be sufficiently compensated for its part in the undertaking is being answered according to reports by pointing to the $250,000,000 return which would accrue to the government from the arrangement with the concession-holding companies to permit purchase of a billion barrels of crude oil at a discount of 25 per cent. The proposed 1,200-mile line of 24-in. and 26-in. pipe from the Persian Gulf to the eastern Mediterranean Coast has been estimated to cost $130,000,000, which would be amortized over a period of 25 years.

Stanolind Stores 100,000 Bbl. In 16-in. West Texas Outlet

A total of 100,000 bbl. has been pumped into the 385-mile 16-in. crude oil line now under construction between Slaughter, Tex., and Drumright, Okla. Consequently, the line is filled at the west end for a distance of 80 miles from Slaughter. Pipe laying operations have been completed for Jobs 3, 4 and 5. Seven miles remained to be laid on Job 1 and 16 miles for Job 2; on each of these jobs one spread is in the field.

Recent weather has been good ex-

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cept for high winds which were severe enough on March 5 to require completely shutting down because it was not possible to protect weldng operations satisfactorily by means of windshields.

Cities Service Starts Tests Of Guymon-Blackwell Line

Cities Service Transportation and Chemical Co. is nearing completion of its 230-mile, 26-in. gas pipe line from the Texas County area of the Hugoton field in the Oklahoma Panhandle area to the Kansas City industrial region. The line is now being tested and cleared with gas from the main line connection at Blackwell, Okla. When the big gas line is completed, some of the 40 wells to which the line is to be tapped, will be opened to permit a similar testing of the line on the west end. The flow will be at well pressures, and not until about April 1, when the compressors at the Guymon pump station are started up, will the company be able to operate at increased pressure. Gas from Cities Service Gas Co. wells and other wells to which it is, or will be, connected will be transmitted to Blackwell and then will move through the main Cities Service line through Wichita to Kansas City.

Products Lines Moved 64 Per Cent More in 1943

Pipe-line transportation of motor fuel in 1943 as a whole was much greater than that of a year earlier, Bureau of Mines figures reveal. Movement of motor fuel in pipe lines in December 1943 registered a considerable increase from the 1942 month, and was higher than in November.

Motor fuel turned into pipe lines in 1943 totaled 206,512,000 bbl., against 126,232,000 bbl. in the corresponding 1942 period, an increase of 63.60 per cent.

Motor fuel deliveries from lines in year totaled 203,678,000 bbl., against against 125,341,000 bbl. in the corresponding 1942 period, an increase of 62.50 per cent.

Total motor fuel turned into lines in December was 19,538,000 bbl., compared with 18,776,000 bbl. in November, and 12,430,000 bbl. in December 1942, an increase of 57.18 per cent. The increase from November was 4.06 per cent.

In December, the total delivered from lines was 19,029,000 bbl., against 18,822,000 bbl. in November, and 11,263,000 bbl. in December 1942, an increase of 68.95 per cent from a year earlier.

Stocks in lines and working tanks at the end of December totaled 8,453,000 bbl., compared with 7,944,000 bbl. a month earlier, and 6,572,000 bbl. a year earlier.

Calculations from Bureau of Mines figures indicate that the volume of motor fuel turned into pipe lines was approximately 34 per cent of the total production of motor fuel in December. This is based on a total production of 57,197,000 bbl. A year earlier, motor fuel turned into lines totaled 12,430,000 bbl., or 25 per cent of the total production of 48,959,000 bbl.

Mexican Pipe Line Rumors Discounted

Deputy Petroleum Administrator Ralph K. Davies last week made this statement concerning published reports that pipe lines across Mexico are under consideration:

"Various alternative methods of moving oil to the Pacific from the Gulf Coast from time to time have been considered by the Petroleum Administration for War. No such project as currently reported in certain newspapers, i.e., pipe lines across the Isthmus of Tehuantepec, has been approved by this office, nor are we informed that the Army or Navy is sponsoring anything of the kind at this time."

Asked as to whether PAW would necessarily know of Army and Navy plans in this direction Mr. Davies stated: "I cannot conceive of the petroleum administration not being fully informed by the military as to any such proposal. The Petroleum Administration for War is responsible for supplying the military with its requirements of petroleum and this responsibility obviously embraces the construction of pipe-line transportation as it may be required to serve that end."

Before this statement was issued it was reported from Mexico City that the government newspaper El Nacional had announced a pipe-line project to improve the distribution of petroleum products in western Mexico. The line was said to be contemplated to extend from Tampico to Guadalajara where a refinery was to be built.

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Natural Gas

FPC Announces Hearing On Hope Gas Projects

WASHINGTON, D. C. — Federal Power Commission will hold a hearing April 12 on applications filed by Hope Natural Gas Co. for permission to construct and operate additional facilities in West Virginia. The projects include facilities necessary to connect with Morris Gas Co.'s lines for transportation of gas into Pennsylvania; 6⅝ miles of 12¾-in. pipe line in Roane County; 9¾ miles of 10-in. pipe line in Harrison County; acquisition of certain holdings of South Penn Natural Gas Co. in Lewis and Doddridge counties; three gas compressors at the Cromwell compressor station in Kanawha County; natural-gas dehydration plant at the Bridgeport compressor station in Harrison County.

Coal and Railroad Interests Oppose Gas Franchises

WASHINGTON, D. C. — Federal Power Commission last week heard final testimony on applications of two competing natural-gas transmission systems to move additional gas into northern Pennsylvania and western New York and also the contentions of coal and railroad interests that such additional gas is unnecessary.

William A. Dougherty, of New York, counsel for Hope Natural Gas Co. and its subsidiary, said that gas supplies of the Oriskany oil fields and local wells were being depleted rapidly and to meet expanding demands it was necessary that his system be permitted to construct facilities to take gas from the pipe line being built by Tennessee Gas & Transmission Corp. from Texas fields into West Virginia.

Attorneys representing applicant companies of Columbia Gas & Electric Corp.'s system, argued the need for permitting that system to construct lines and pumping stations also to take gas from the Texas-West Virginia line.

Attorneys for the applicants stated they had contracts, made contingent upon completion of the Tennessee corporation's line into West Virginia, to deliver the gas to distributing companies. They agreed that unless the applications were granted, supplies from the Oriskany and local wells soon would be unable to meet the demand.

R. Granville Curry, speaking for Anthracite Institute; A. S. Knowlton, representing eastern railroads, and Tom McGrath, representing United Mine Workers and National Coal Association, contended as intervenors in the hearing that there was no public necessity for piping additional gas to the area because adequate coal supplies were available.

FPC Postpones Hearing on Montana-Dakota Gas Case

WASHINGTON, D. C. — Federal Power Commission has named May 3 as the postponed date for its hearing in Minneapolis, Minn., to determine whether Montana-Dakota Utilities Co. is a natural-gas company within the meaning of the law and whether any of the company's charges are unfair. February 9 was the date originally set.

Louisiana's Gas Reserves Shrinking, Says Frye

NEW ORLEANS, La.—Louisiana's reserves of natural gas are being depleted at the rate of "about ½ trillion cubic feet annually," according to P. A. Frye, secretary and executive officer of Louisiana Public Service Commission. Speaking at a meeting of the Rotary Club, Frye predicted that the state's reservoirs of natural gas would be exhausted within approximately two decades unless additional reserves are found.

FPC Issues Information on 118 Natural-Gas Concerns

WASHINGTON, D. C. — Federal Power Commission has issued an 87-page report containing financial and operating information on 118 gas companies which reported an aggregate book investment in gas plant of $1,759,882,373 as of December 31, 1942. The report was compiled as a part of the commission's administration of the Natural Gas Act.

The companies are limited to those which, for administrative purposes, have been determined to be natural-gas companies within the meaning of the Natural Gas Act. The jurisdictional status of certain companies remains in question.

The 118 companies reported total assets and other debits aggregating $2,691,185,623 as of December 31, 1942. They served a total of 3,295,178 customers, of which 1,270 were other gas utilities and the remainder ultimate consumers. Sales by the 118 gas companies in 1942 to ultimate consumers amounted to 850,527,648,000 cu. ft. at revenues of $248,265,218 and sales to other gas utilities amounted to 1,267,792,992,000 cu. ft. at revenues of $238,539,810.

Peoples' Rate Reduction Is Accepted by Commission

HARRISBURG, Pa.—A controversy of 7 years' duration has ended with acceptance by Public Utilities Commission of an offer from Peoples Natural Gas Co., of Pittsburgh, to reduce rates $221,232 a year and refund $500,000 to 160,000 customers in 14 western Pennsylvania counties.

The commission in 1942 ordered the company to reduce its rates $1,000,000 a year and refund $2,000,000 to customers for 1939 to 1941. The company appealed to the Superior Court, which returned the case to the commission for further action.

Natural Gasoline

Pressure-Maintenance Unit In Luby Field Planned

AUSTIN, Tex.—Railroad Commission of Texas will hold a hearing March 10 to consider the application of Stanolind Oil & Gas Co. and Seaboard Oil Co. of Delaware to construct and operate a pressure-maintenance plant in the Luby field, San Patricio County, Texas.

Permission to Use Gas for Carbon Black Is Asked

AUSTIN, Tex.—Railroad Commission of Texas held a hearing March 7 to consider the application of Smith Brothers Refinery Co., Inc., for permission to operate its 11 Laycock, a statutory sweet-gas well in the Kellerville area of Wheeler County, in such manner as to use a portion of the gas for the manufacture of carbon black and, after having removed the natural-gasoline content from the remaining gas reinject it under low-pressure oil leases in the area, and in addition to sell for carbon-black manufacture the casinghead gas resulting from the repressuring operation.

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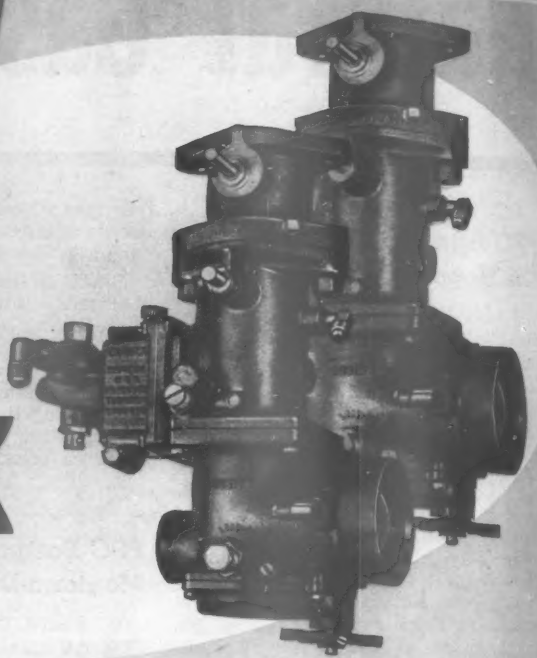

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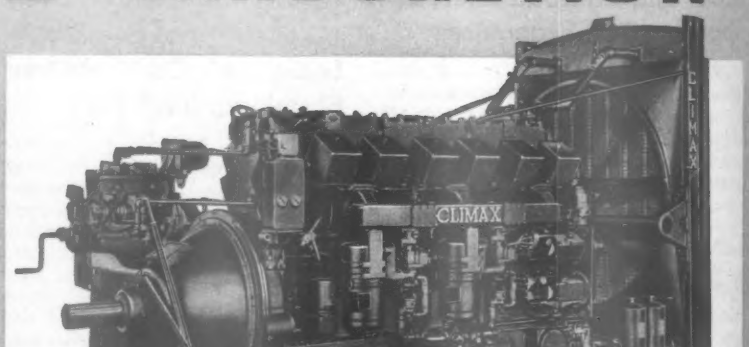

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1. Keep engine lubricants clean, and maintain oil at proper level. Change oil after each 100 hours of operation.
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Exploration and Drilling

Week's Highlights

CRUDE production at present levels is being maintained only by the most intensive reworking of older productive areas, reinterpretation of the geology of drilled-over areas and in general fine combing with all the latest techniques of geology, geophysics and exploration drilling.

Developments are proving to the hilt that the industry was absolutely correct in telling the Government that it took 2 years from the discovery of an important wildcat area to develop important production. The situation at the present time is roughly as follows:

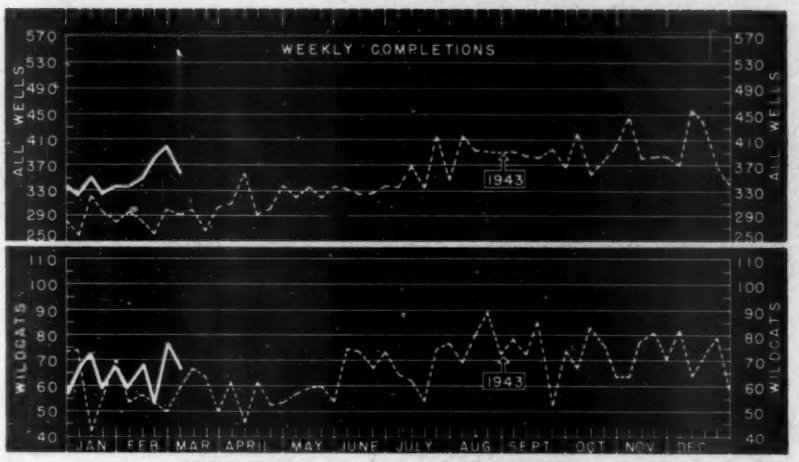
1. In Mississippi, Alabama and Florida an important petroliferous province is showing encouraging signs and 5 years from now may be a very important producing area. Mississippi may possibly develop sufficient increases in production early enough to be of some assistance in the present war, but even this is somewhat questionable, as big increases in production are probably nearly 2 years off.

2. In the Permian basin of West Texas and New Mexico, an area exists where rapid increases in production could be developed, if transportation bottlenecks can be removed.

3. Elsewhere, at the moment, there is nothing on the horizon that promises to do much more than maintain present production. Even maintenance of present production is calling for the most strenuous efforts for mediocre results.

The materials situation is showing signs of easing and operators and local governmental officials are putting pressure on Washington to relax spacing requirements. Such pressure aids in getting more materials, and there is some evidence that PAW is not averse to having industry pressure as an argument to present to the War Production Board, which after all allocates the total steel quota for the petroleum industry.

In all probability, unless present trends reverse themselves, it will require closer spacing to maintain present production and get the oil that is necessary to win the war. It is regrettable that it will require more tons of steel to develop and maintain production, but after all this is merely the day of reckoning for the postponed use of steel that did not go into wells during the first 2 years of the war.



Solid line charts current weekly completions

COMPLETIONS IN ALL FIELDS . . .

(Week ended March 4, 1944)

	Oil	Gas	Dry	Total	Footage	Comp. to date Total 1944	1943
N. Y., Penna., W. Va.	46	16	1	63	119,816	544	513
Ohio	2	9	8	19	48,150	156	124
Indiana	1	0	1	2	3,721	46	46
Kentucky	6	0	2	8	16,374	98	37
Illinois	27	0	9	36	89,715	289	322
Michigan	6	0	6	12	29,975	96	66
Kansas	14	2	14	30	103,529	281	227
Nebraska	0	0	0	0	0	8	3
Missouri-Iowa	0	0	0	0	0	3	2
Oklahoma	15	4	14	33	115,512	252	189
Texas:							
North Central Texas	16	0	1	17	47,796	210	197
West Texas	23	0	2	25	103,773	245	150
Texas Panhandle	0	0	2	2	6,151	22	33
Eastern Texas	0	0	2	2	17,051	51	44
Texas Gulf Coast	7	0	5	12	78,540	86	65
Southwest Texas	8	2	15	25	143,034	178	150
Total Texas	54	2	27	83	396,345	792	639
Louisiana:							
North Louisiana	2	0	5	7	31,188	44	55
Louisiana Gulf Coast	10	0	1	11	101,435	68	56
Total Louisiana	12	0	6	18	132,623	112	111
Arkansas	3	0	1	4	33,514	37	38
Mississippi and Southeast	0	0	0	0	0	26	8
Montana	3	0	2	5	12,405	39	26
Wyoming	5	0	1	6	23,679	21	23
Colorado, Utah	2	0	1	3	10,193	7	1
New Mexico	7	0	3	10	30,038	68	33
California	21	0	5	26	91,858	301	169
Total United States	224	33	101	358	1,257,447	3,176	2,577
Total previous week	240	38	121	399			
Week ending Mar. 6, 1943	163	31	97	291			

OKLAHOMA

W. Edmond Extended Half Mile East

THE productive limits of the West Edmond field were extended a half mile east this week. A northeast extension was registered in Dickey Oil Co. 1 Crookham, SW NW 28-14n-4w, reported flowing 50 bbl. per hour, and the southeast extension was confirmed by official completion of Fox & Fox 1 Kiefer, NW NW 4-13n-4w, flowing 461 bbl. in 3 hours. Wegner 1 Lenhart, NW NE 5-13n-4w, completed flowing 472 bbl. in 4 hours makes south end look good.

In Caddo County, West Cement area, Amerada 1 Edwards, NE SW NW 1-5n-10w, was completed as 528-bbl. well, the best completion reported outside the West Edmond area.

Activity continues high throughout the state and completions reflect this stepup with 15 oil wells, 4 gas wells and 14 dry holes reported. It was a poor week for the wildcatters, 9 completed, 9 dry holes. Garfield, Garvin, Kay, Lincoln and Osage counties contributed one dry wildcat each; Noble and Payne counties each had two dry wildcats reported completed. At the end of the week, however, several wildcats were reported to be showing favorable indications and the percentage of successful wildcats is expected to improve sharply in the near future.

OKLAHOMA WILDCAT COMPLETIONS

Garfield County: Fain-Porter 1 Whitaker, NW NW SE 27-24n-3w, dry, TD 5,099 ft., Layton 3,823, Wilcox 5,056, second Wilcox 5,105 ft.

Garvin County: Anderson & Prichard et al 1 Bowling, SE SE 20-3n-2e, dry, TD 3,205 ft.

Kay County: Amerada 1 Burke, NW NE SE 31-25n-2w, dry, TD 5,267 ft., Layton 3,625 ft., Wilcox 4,855 ft., Arbuckle 5,175 ft., electric log.

Lincoln County: Flynn Oil 1 Hubbell, SW NE 5-12n-4e, dry, TD 5,483 ft., Hunton 5,215 ft., Wilcox 5,439 ft., second Wilcox 5,478 ft., electric log.

Noble County: Aladdin Petroleum 1 Bedicek, NE NE NW 13-20n-1w, dry, TD 5,434 ft., Layton 4,000 ft., Wilcox 5,325 ft., second Wilcox 5,410-5,434 ft., electric log.

N. E. McNeil 1 fee, NW SE 26-21n-3e, dry, TD 4,316 ft., Wilcox 4,272, second Wilcox 4,316 ft., electric log.

Osage County: Paul Badami No. 1, NE NW NE 31-29n-6e, dry, TD 2,988 ft., Burbank, 2,888-2,891 ft., Mayes 2,942 ft.

Payne County: Olean Petroleum 1 Wheeler, NE NE SW 15-19n-1w, dry, TD 5,098 ft., Layton 3,700 ft., Wilcox 5,098 ft., electric log.

Robert Burns 1 Anderson, SW SW 2-20n-3e, dry, TD 4,501 ft., Viola 4,400 ft., Wilcox 4,455 ft., second Wilcox 4,485 ft.

APPALACHIAN FIELDS

New Gas Horizon Believed Opened in Wood County

PITTSBURGH, Pa.—A new gas horizon appears to have been opened in Wood County, West Virginia, with a good volume of gas struck in the shales in the upper part of the Devonian series. The wildcat of Hope Natural Gas Co. on the Big Run Oil Co. lease (Joanna Drake), originally scheduled for an Oriskany test, found no Berea present, but had a showing of gas at 2,782-92 ft., which increased until at 3,024 ft. it tested over 1,000,000 ft. It was drilled deeper and at 3,088 ft. the gage showed 3,200,000 cu. ft. of gas. The formation is unidentified, but might correspond to the Speechley horizon or the Warren series. It is a shale with pieces of sand intermingled. The surface elevation is 764 ft., Big lime 1,533 ft., Injun 1,564 ft. The test is in the Williams district.

In Marion County, Hope deepened an old gas well drilled in 1892, its 124 B. F. and John Blackshere farm, in Mannington district, from the Injun sand at 1,883 ft. to the Gordon sand. From the latter formation it is producing about 10 bbl. a day at total depth of 2,643 ft.

In Wetzel County, South Penn Oil Co. is completing 19 Mike Barr tract in the Grant district in the Injun sand, from which it is flowing 78 bbl. a day at total depth of 2,114 ft. This is the second good oil well on the tract, though other wells produce both oil and gas.

In Southwest Pennsylvania, completions were small, except the test of Carnegie Natural Gas Co. on the H. C. Frick Coal Co. in German Township, Fayette County, which is good for 882,000 cu. ft. of gas.

CALIFORNIA

Shell Test May Be Opening New Heavy-Crude Field

LOS ANGELES, Calif.—Shell Oil Co., Inc., appears to have discovered a new accumulation of heavy crude oil about 2½ miles southeast of the old Kern River field, but its importance is not yet clear. A few weeks ago Standard Oil Co. of California completed a small pumping well in the Kern Bluff district, not far from Shell's test and while both wells showed relatively small production, they could be edge wells around a secondary accumulation south of the old Kern River field. With Standard of California starting additional holes, the significance of this area from a production standpoint may be clarified soon.

Harold and Edwin Pauley have landed pipe in their wildcat in the El Segundo district of Los Angeles Basin, presumably to test for production. This wildcat, which is being drilled to test the production possibilities of the nodular shale and schist conglomerate, has had oil and gas showings below 7,200 ft. Information has been tightly held.

Barnsdall Oil Co. has landed casing in its Sunny Hills wildcat preparatory to an early production test and if it is successful the company will open up a new field in the Coyote district of Orange County. The lower part of this hole ran predominantely to gray shale, and the company has accordingly plugged bottom. West of the Aliso Canyon field, in upper Los

DAILY AVERAGE PRODUCTION FOR WEEK

	Mar. 4 crude oil	Distillate, allied products	Feb. PAW quota all oils	Feb. 26 crude oil
Arkansas	79,300	5,000	81,700	78,800
California	827,150	47,200	880,600	820,250
Colorado	7,470	.....	7,000	8,670
Eastern	72,150	8,900	81,100	68,720
Illinois	208,700	13,000	228,000	211,140
Indiana	13,080	.....	13,600	12,450
Kansas	272,800	6,000	291,000	279,700
Kentucky	20,400	2,800	26,800	20,110
Louisiana	360,150	28,000	375,700	359,200
North Louisiana	76,500	.....	.....	76,100
Louisiana	283,650	.....	.....	283,100
Michigan	52,500	300	52,300	52,100
Mississippi	43,600	.....	46,000	43,300
Montana	21,290	300	24,300	24,970
Nebraska	1,320	.....	1,000	1,100
New Mexico	112,650	4,900	116,600	112,525
Oklahoma	327,600	27,000	355,000	324,500
Texas	1,885,600	127,000	1,965,000	1,916,250
East Texas	376,000	.....	.....	390,600
West Texas	349,150	.....	.....	362,000
North Central Texas	141,450	.....	.....	139,950
East Central Texas	116,700	.....	.....	116,850
Texas Panhandle	96,750	.....	.....	102,000
Texas Gulf	710,250	.....	.....	709,750
Southwest Texas	95,300	.....	.....	95,100
Wyoming	94,040	7,200	100,200	95,430
Total United States	4,399,800	277,600	4,645,900	4,429,215

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Same period last year ..... 343,367,335 bbl.

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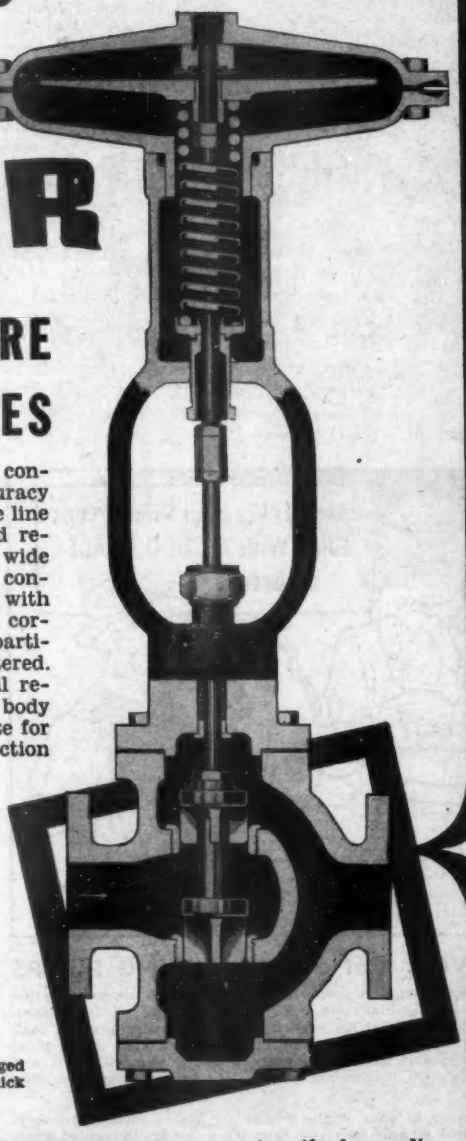
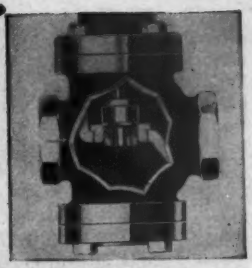
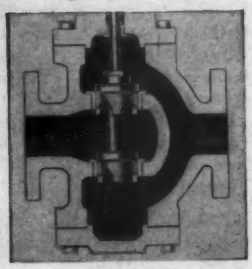


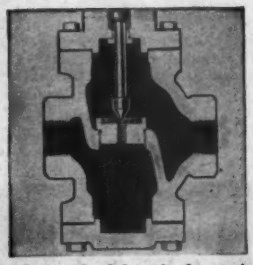
Type 57 with standard flanged globe double port body and quick opening type inner valve.



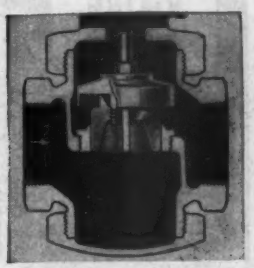
Screwed globe single port body with quick opening inner valve.



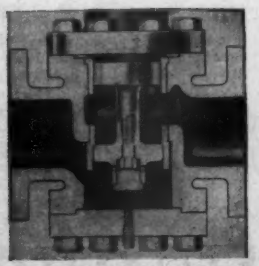
Flanged globe double port body with V-Port type inner valve.



Screwed globe single port body with needle point inner valve.



Reversible bronze single port body with composition disc inner valve.



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Angeles County, Barnsdall and Bandini Petroleum Co. are preparing to conduct a production test, 1 Roosa, 29-3n-16w, following the landing of casing at 5,515 ft. The lower part of this hole has been abandoned owing to steep dips and gray sand. The test is about 3,000 ft. northeast of Standard of California 1-2 Frew, an outpost being drilled in an effort to extend the Sentous zone westward.

Los Angeles Basin is receiving more attention from prospectors than for several years. A wildcat of Seaboard Oil Co. will be bottomed beneath Elysian Park by directional drilling from a location outside the park. General Petroleum Corp. is going back into the Norwalk area for a second wildcat and Gilco, Inc., is preparing to start a wildcat in the Seal Beach district. Richfield Oil Corp. has been coring oil sand in its San Fernando wildcat.

CALIFORNIA WILDCAT COMPLETIONS

East Stockton wildcat district, San Joaquin County: Richfield 1 Stockton, 5-1n-8e, abandoned in basement granite at 8,544 ft.; base Valley Springs formation 1,761 ft., base conglomerate 2,935 ft., base Mehrton 3,136 ft.

Fruitvale wildcate district, Kern County: P. M. Girard 1 Signal Tieck, 13-29s-27e, abandoned as wet at 3,126 ft.; production test 2,605-11 ft., swabbed 100 bbl. daily rate, but water broke in and could not be excluded.

Tejon wildcat district, Kern County: Richfield 65-7-B Tejon, 12-11n-19w, abandoned in gray sand and clay at 2,304 ft.

CANADIAN FIELDS

Taber Extension Showing Higher-Gravity Production

CHATHAM, Ont. — McLeod Oil Co. of Calgary has taken over and will complete Noble Drilling Co. 1, LSD 4, 33-8-17w4, in the Taber field. This test is 3 miles south and 4 miles west of the Dominion producers.

In the main Taber field, Dominion Oils 71-20-B, LSD 4, 20-9-16w4, finished at 3,187 ft., water-free 18-gravity crude from the Taber sand rising to 1,620 ft. inside an hour. The 7-in. casing has been set at 3,166 ft. for a swabbing test. West and south of the field, Mid-Continent Oil & Gas 3, LSD 13, 1-8-17w4, finished at 3,276 ft., will be shot following early swabbing tests which recovered crude oil of 23 and 25 gravity, compared with the 18.5-gravity oil of the Dominion producers.

Del Bonita.—In the Del Bonita field, near the Montana boundary, Pacific Oil & Refining 1, LSD 12, 18-1-21w4, bottoming in the Madison limestone at 5,080 ft., is acidizing and testing, with shows of light crude.

Aldersyde. — On the High River-Aldersyde structure east of Turner Valley, New Ranchmen's-Snyder 1, LSD 16, 34-19-29w4, which got the Madison limestone around 7,865 ft., will deepen to test that formation.

Wartime Oils. — In West Central Turney Valley, Anglo-Canadian 13, LSD 6, 25-19-3w5, has spudded, making the fifteenth test sponsored by Wartime Oils to drill this area. Three more wells are preparing to start. Of the active tests, four have received temporary allowables: Okalta 12, with 150 bbl.; Okalta 15, with 100 bbl.; Okalta 14, with 30 bbl. after partial acidizing; and Pacafic Petroleum 6, with 300 bbl.

MICHIGAN

Oil Operators Lease 30,000 Acres of Land at Auction

SAGINAW, Mich.—Operators leased another 30,000 acres of state-owned land last week, paying a total of $20,000 on offerings at auction by the state conservation department. Highest bid was the $10,100 paid by J. V. Wicklund Development Co., Detroit, for a 40-acre tract in Deepdale Township, Arenac County, a half-mile from a good producer drilled in a month ago.

F. R. Frye, department geologist, declared Michigan crude production is "pretty steady" despite absence of substantial discoveries in the past year. He estimated March production will be about 51,980 bbl. a day, compared with an anticipated demand of 55,344 bbl. Tentative figures indicated the production average for February was 52,190 bbl. Reduced proration schedules imposed in June and December last year account for most of last year's decline, Frye said.

To keep refineries in the Midwest running at capacity, R. J. Hoffmaster, state supervisor of wells, was requested by District 2 officials to increase Michigan production this month to 53,800 bbl.

MICHIGAN WILDCAT COMPLETIONS

Barry County, Barry Township: Harold E. Smith 1 Lechleitner, NW NE SW 2-1n-9w, pumped and flowed 110 bbl. in Traverse limestone, TD 1,807 ft.

Clinton County, Ovid Township: Charles W. Teater 1 C. Walker, C W½ SW NW 8-7n-1w, dry at 2,900 ft.

Isabella County, Wise Township: Rex Oil & Gas Co. 1 Fred D. Nurnberger, NW NE NE 25-16n-3w, dry at 4,002 ft.

Mecosta County, Hinton Township: Chapman Oil Co. 1 James Stehower, C E½ SE NE 29-13n-8w, dry in Marshall formation, TD 3,597 ft.

Montcalm County, Home Township: Stewart Oil Co. and Burke White 1 E. Jorgensen, C NE NE 14-12n-6w, pumped 60 bbl., TD 3,477 ft. (Dundee formation).

Muskegon County, Sullivan Township: Edward B. Strom, Tr., 1 George Rettenhouse, NW SE SE 24-9n-15w, dry at 1,867 ft.

Van Buren County, Columbia Township: William H. Clock 1 Milford Decker, SE NW NE 31-1s-15w, dry at 1,165 ft.

Geneva Township: S. L. McCall 1 Jennings, SW SW NE 12-1s-16w, dry at 1,160 ft.

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EASTERN TEXAS

Northern Wood County Has Glen Rose Production

DALLAS, Tex. — First production from the Rodessa section of the Glen Rose zone of the upper Trinity for Wood County has been obtained in Shell Oil 1 Whatley, John Polk Survey, on the southeast flank of the Manziel structure. This well, drilled to total depth of 9,005 ft., plugged back and perforated at 8,455-85 ft., flowed 169 bbl. in 20 hours. On later gage it flowed 378.15 bbl. in 27 hours, or at the rate of 336 bbl. per day, with ¼-in. choke on bottom, ½-in. choke on top, and tubing pressure of 675 lb. to 700 lb. Operator was to reperforate the casing at 8,095-8,525 ft. Discovery of oil from this horizon at Manziel gives credence to the theory that the southeast flank of the Quitman structure may also produce from the Rodessa, and efforts are being made to unitize acreage in this area for a deep test.

Gulf Oil 1 Brewer, Benjamin Lee Survey, southwest of Winnsboro, at total depth of 8,719 ft., was testing the Rodessa section of the Glen Rose for production through perforations at 8,268-88 ft. Top of the Glen Rose was called 6,707 ft., and a core from 8,014-33 ft. had shown some lime with porosity and saturation.

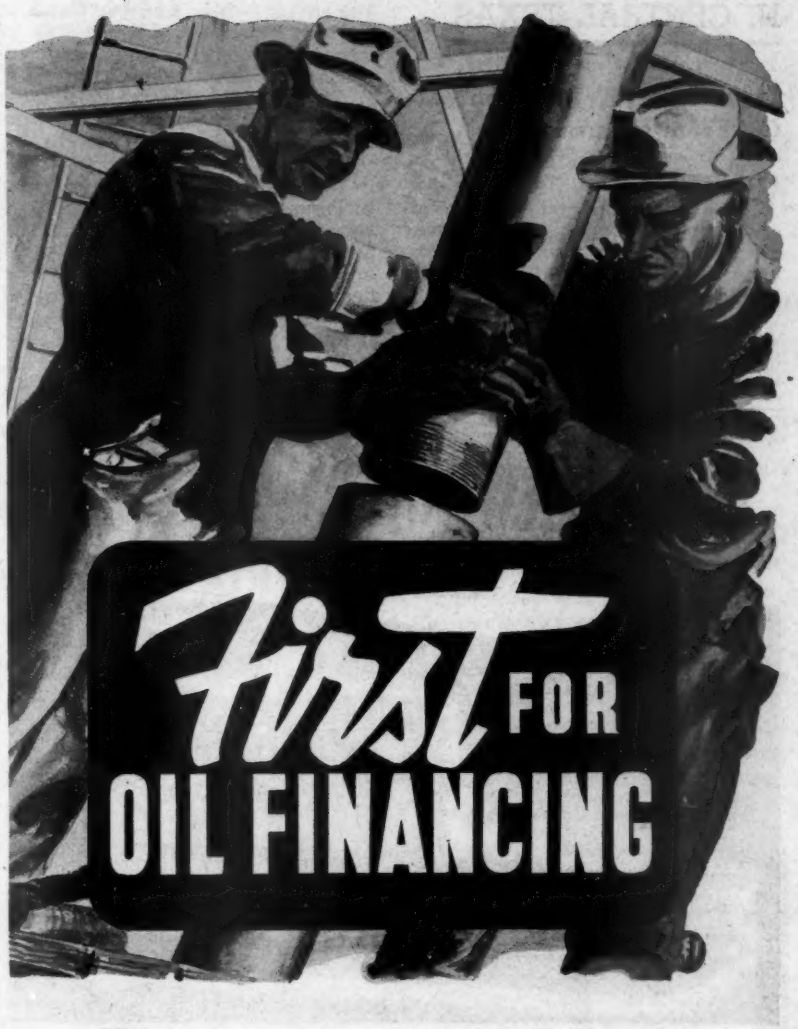
Navarro County. — Failure loomed for Brown & Wheeler et al 1 Guy Gibson, wildcat in southern Navarro County, which has been perforating and testing zones which showed kick on electric survey. Casing was perforated at three levels from 6,656 to 6,718 ft., and formation treated with 4,000 gal. of acid through the perforations, but recovery failed to show any oil. The wildcat is bottomed at 7,528 ft., with 5½-in. casing cemented at 6,910 ft. Casing has been shot off and pulled, and the sub-Clarksville zone, which showed gas, will be tested from about 3,318-33 ft.

Van Zandt County. — Successful completion for a small well was assured at Superior Oil Co. 1 C. A. Groves, 4½ miles north of Canton. This wildcat, at total depth of 9,003 ft., has opened a new pool from the Glen Rose formation. With 2½-in. tubing at 7,500 ft., on the last pumping gage, it was reported to have made 88 bbl. of oil testing 39.8 gravity.

EAST TEXAS WILDCAT COMPLETIONS

Robertson County: A. G. Hill et al 1 W. C. Anderson, 3 mi. NW of Calvert, elev. 326 ft., Pecan Gap 3,374 ft., Austin 4,809 ft., Woodbine 5,120 ft., Edwards 5,644 ft., Paluxy 6,108 ft., Glen Rose 6,161 ft., Pettit (faulted) 6,999 ft., Cotton Valley 8,700 ft., dry at 10,288 ft.

Wood County: H. L. Hunt 1 J. W. Kennedy, ¾ mi. SE of Quitman field, elev. 442 ft., Pecan Gap 2,570 ft., Austin 4,000 ft., Woodbine 4,475 ft., Georgetown 5,150 ft., Goodland 6,300 ft., Paluxy 6,370 ft., dry at 6,771 ft. in Glen Rose.



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N. CENTRAL TEXAS

Jack County Wildcat Shows Oil From Mississippian

WICHITA FALLS, Tex.—Shell Oil 1-A Lester, 5½ miles northwest of Jacksboro, promised to open a new oil field for Jack County from the Mississippi lime when it showed oil on drill-stem test at 5,448-5,510 ft. On the test it showed gas in 2 minutes, oil in 5 minutes, and at the end of the test, oil had risen 300 ft. in the hole. The oil tested 40 gravity. Top of the Mississippi was called at 5,444 ft. The Weir pool received its largest producer when the north extension, Continental Oil Co. 3 Cooper, F. D. Hammond Survey, gaged 232 bbl. per day form the Strawn sand pay at total depth of 2,342 ft.

Grayson County.—Still being closely watched is Sinclair Prairie 1 Geo. A. Fischer, 2½ miles south of Whitesboro and about 4 miles east of the new Strawn sand pool at Woodbine in eastern Cooke County. This test has reported several good shows. The latest was at 4,822-32 ft., but a drill-stem test tested salt water and the well was being drilled deeper.

Wilbarger County.—Pump was to be installed on the second producer for the Mains pool of western Wilbarger County, The Texas Co. 1. J. W. Cooke, an east offset to the discovery. The test swabbed 73 bbl. of oil, no water, in 5 hours after treating with 1,000 gal. of acid.

Montague County. — Whitaker Oil Co. 1 Donald, north outpost to the Hildreth pool, indicated a mile extension in the conglomerate zone when it showed oil at 6,166-83 ft., and was taking a drill-stem test. Final gage on the west extension, C. H. Murdick et al Walthall, was 151.88 bbl. in 6 hours through ½-in. choke. Sinclair Prairie 1 Templeton, wildcat 2 miles northeast of Denver, was shut down on account of bad roads after showing oil in conglomerate at 6,117-27 ft. Continental Oil Co. 1 Hogue, 4 miles north of St. Jo, became the second shallow well in the new area when it was completed for 60.5 bbl. a day from 2,752-2,800 ft.

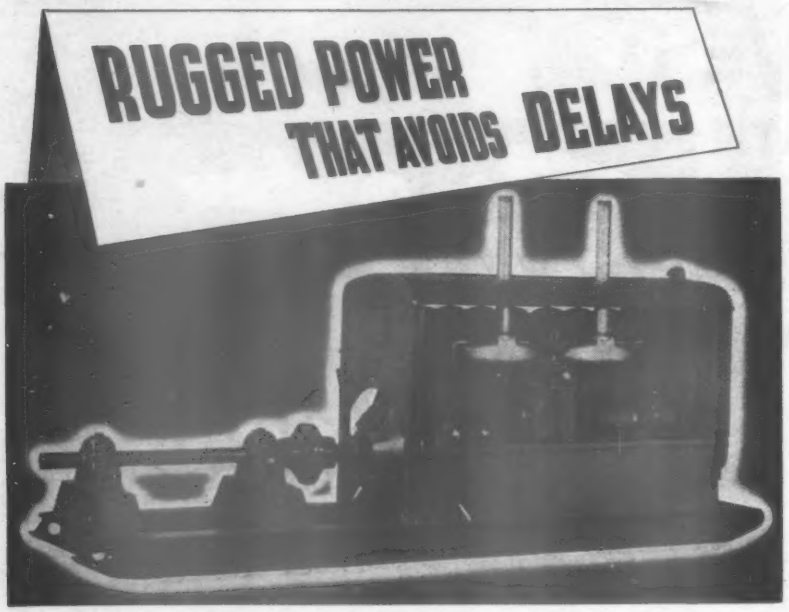
Young County. — In the Bunger Marble Falls pool, Lupton & McLester 1 Haberthur, wast offset to the discovery well, McLester 1 C. M. Johnson was completed flowing at the rate of 1,488 bbl. per day from pay topped at 3,990 ft., and total depth of 4,003 ft. The well is in the northeast corner of the S. L. Ribble Survey, near the Palo Pinto County line.

NORTH CENTRAL TEXAS WILDCAT COMPLETIONS

Cooke County: Northern Ordnance 1 L. R. Haney (Foy Davis), 1 mi. E of Woodbine, pump 110 bbl., 1.6 per cent water, 28 gravity, Strawn sand pay 4,350 ft., TD 4,357 ft. Discovery, Woodbine pool.

WEST CENTRAL TEXAS

ABILENE, Tex. — Second oil producer for the Brownville Mississippi lime pool in northern Stephens County has been completed by Texas Pacific Coal & Oil Co. It is 3-C Brown which pumped 119 bbl. per day, 17 per cent water. Pay was topped at 4,340 ft. and the hole was bottomed at 4,365 ft. This is the third well completed in the pool.



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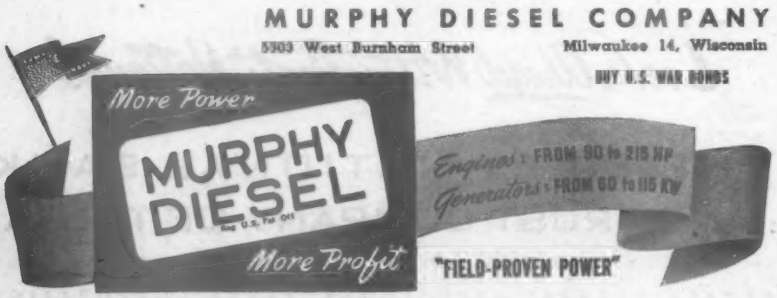

TEXAS GULF COAST

Colorado County Well May Produce From Three Sands

HOUSTON, Tex.—Cities Service Oil Co. and Jack Frazier et al are still testing the 1 C. K. Gay et al, 3 miles northwest of Columbus, Colorado County, and another horizon has been proved for gas condensate production, making three possible Wilcox producing sands in the well. Latest test was made in perforations at 7,310-14 ft. On the first drill-stem test here, using ⅞-in. top and ¼-in. bottom chokes, it flowed at the daily rate of 1,485,000 cu. ft. of gas, 33.3 bbl. of 53-gravity condensate and 9.3

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bbl. of water. Working pressure was 175 lb. and gas-oil ration 38,300. The two other prospective completion horizons are at 7,810-12 ft. and 7,664-68 ft.

Shell Oil Co., Inc., 10 Plow Realty Co., northeast extension test at Sheridan field, Colorado County, swabbed about half oil and half salt water from perforations at 10,883-11,135 ft. It then squeezed, reperforated at 10,568-72 ft. and squeezed, reperforating for another test. Total depth is 11,404 ft.

Gulf Oil Corp. completed two more excellent dual oil-sand producers in the Stowell field. The 1 Wasson et al Unit, Lopez Survey A-16, Chambers County, at total depth of 7,792 ft., flowed 303 bbl. a day through 5/32-in. choke from pperforations at 7,779-91 ft. and 347 bbl. through 7/32-in. choke from perforations at 7,610-34 ft. The company's 1 Owens et al Unit 1, Lopez Survey A-37, Jefferson County, flowed 309 bbl. a day through 7/32-in. choke from perforations at 7,574-84 ft. and 447 bbl. through 7/32-in. choke from perforations at 7,779-54 ft.

TEXAS GULF COAST WILDCAT COMPLETIONS

Fayette County: Continental 1 A. E. Adamcik, 4 mi. NE of Cistern, dry at 4,834 ft.
Jefferson County: Sinclair Prairie 1 J. M. Webb, in East Stowell area, dry at 10,775 ft.
Liberty County: W. W. West 2 W. W. West et al fee, SE flank Davis Hill dome, dry at 6,658 ft.
Matagorda County: Texas 3 C. G. Hamill, 9 mi. S of Sargent, temporarily abandoned at 7,500 ft.
United North & South Development Co. 2 J. E. Dawdy, 1 mi. E of Buckeye, dry at 8,273 ft.

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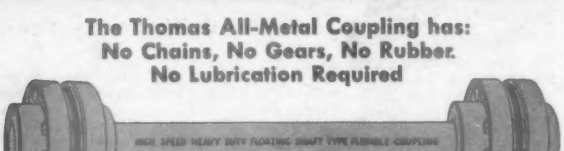

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THOMAS FLEXIBLE COUPLING CO.
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SOUTHWEST TEXAS

New Oil Field in Prospect For San Patricio County

CORPUS CHRISTI, Tex.—A new oil field seems in prospect for San Patricio County, about 2 miles southeast of Gregory, where Humble Oil & Refining Co.'s 1 James F. Green estate recovered 528 ft. of pipe-line oil of 45.7 gravity on drill-stem test. Total depth is 10,010 ft. and completion was expected soon. Previous tests in this hole had yielded salt water.

American Republics 1 M. I. Richardson et al, about 2½ miles west of the Bridwell field, Duval County, was shut down for orders at total depth of 3,944 ft. after a drill-stem test at 3,934-44 ft. had developed 775 lb. working pressure and recovered 120 ft. of oil in 10 minutes. The shutdown was ordered because of loss of returns up the hole.

Sam E. Wilson, Jr., was preparing to test the 1 J. P. Minten estate, 4,300 ft. northeast of the 1-A de Garza, discovery well at Wilson field in Jim Wells County, after setting casing to total depth of 7,974 ft. The discovery well of this field made a big condensate flow at 7,920-27 ft. and also had shown for condensate production at 7,348-53 ft.

Sunray Oil Corp. 1 Joe Sklar, completed last October in a new deeper pay sand on the southwest flank of the Placedo field, Victoria County, has been plugged back and recompleted at 6,678 ft. in perforations in sand topped at 6,614 ft. flowing 127.29 bbl. a day on 7/64-in. choke.

Shell Oil Co., Inc., recently completely two wells in a new oil pay for the Seeligson field of Jim Wells County, the new sand designated as Zone 16. Although several wells have produced gas from this zone, these are the first oil producers. First well completed was Shell's 15 Seeligson. The new sand was perforated at 5,510-20 ft. and it flowed 99.25 bbl. on 7/64-in. choke. The second well for the sand was 17 Seeligson. The new zone, with perforations at 5,535-65 ft., flowed 102.03 bbl. on 7/64-in. choke.

Magnolia Petroleum Co. will drill a 10,000-ft. wildcat north of Burnell in southern Karnes County, the 1 Russell-Atkinson, about 3½ miles southwest of the Hondo Creek discovery well.

Pure Oil Co. 1 Jewell May, southwest outpost at Blanconia field, Bee

County, set 5½-in. casing to 4,075 ft. to complete in the Frio gas sand.

LOWER GULF COAST WILDCAT COMPLETIONS

Bee County: H. B. Zachry Co. 1 Page in B. Q. Hadley Sur. A-196, dry at 3,858 ft.

Nueces County: Sun Oil Co. 1 E. T. Rewalt, 3 mi. E of Robstown, dry at 7,403 ft.

San Patricio County: Texas Conservation Oil Co. 1 J. M. Elliott, extension test at Noth Odem, dry at 5,475 ft.

Victoria County: Sunray 1 Joe Sklar, in SA&MG RR Sur. 7, A-304, new pay discovery SW flank Placedo field, recomp. 2-15-44 in new pay topped at 6,614 ft.., 127.29 bbl. through 7/64-in. choke, gas-oil ratio 598, TD 7,010 ft., PB 6,678 ft.

SOUTH TEXAS WILDCAT COMPLETIONS

Duval County: M. E. Davis 1 Mrs. J. Barnes, 6 mi. NE of Benavides, dry at 6,205 ft.

Taylor Refining Co. 1-D Atlee Parr, 1 mi. N of old Thomas-Lockhart field, dry at 5,746 ft.

Jim Hogg County: Texas 1 W. H. Yaeger, 2 mi. NW of Yaeger field, dry at 4,509 ft.

Live Oak County: Humble 1 F. E. Pace, ¾ mi. SW of Mikesha, dry at 7,403 ft.

Starr County: Sun Oil Co. 1 Z. Solis et al, 2 mi. SW of Frost field, perf. 32 shots at 4,072-80 ft., comp. 2-15-44, PT est. 8,500,000 ft. gas open flow per day, TP and CP 1,400 lb. flowing on 9/64-in. choke, TD 5,515 ft.

Zapata County: Coastal Refining, Inc. 1 Madalyn Edgington Leyendecker, 12 mi. NE of Zapata, dry at 3,505 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Guadalupe County: Jose H. Burt 1 Nehemiah Hartfield, 3 mi. N of Lavernia, dry at 2,056 ft.

LOUISIANA GULF

New Shallow Oil Sand Is Opened in Erath Field

NEW ORLEANS, La.—A new shallow oil sand was opened in the Erath field, Vermilion Parish, by Phillips Petroleum Co. at the 1 Adelaide, 28-13s-4e. Drilled to total depth of 7,500 ft. with pipe set near bottom and perforated at 7,380-83 ft., the well showed oil on drill-stem test. On production test it flowed 46.23 bbl. in 4 hours on ⅛-in. choke, with tubing pressure 800 lb. and gravity 30. Most of Erath's production is from deeper levels and is generally gas-condensate.

Union Oil Co. of California 1 Edgewood Land & Logging Co., in Section 25-6s-10w, Gordon area, Beauregard Parish, is opening a new gas-condensate field in Louisiana Coast area. Total depth 6,900 ft., 5½-in. set at 6,818 ft., perforated 6,780-82 ft., flowed gas-condensate on drill-stem test, tubing pressure 2,200 lb., still testing.

New flank production has been opened at the Pine Prairie field in Evangeline Parish, where Hassie Hunt's Crowell-Spencer, in 27-3s-1w, on the northwest flank, was completed in the Sparta. This is the first Sparta production on that part of the dome. The flow was 235 bbl. a day on 21/64-in. choke from perforations at 9,490-9,522 ft. and 9,540-70 ft. Total depth is 10,816 ft. in Wilcox shale.

Superior Oil Co. of California 1 Continental Land & Fur Co., at Bayou Penchant, Terrebonne Parish, flowed gas with some condensate from perforations at 9,929-35 ft., plugged back and tested dry gas in perforations at 8,118-23 ft. It is now retesting in the 9,929-ft. perforations. Total depth is 11,828 ft.

LOUISIANA GULF COAST WILDCAT COMPLETIONS

Evangeline Parish: Continental and Humble 4 Pardee Lumber Co., 1¼ mi. N of Reddell field, dry at 12,082 ft.

Hassie Hunt, Tr., 3-C Crowell-Spencer. 27-3s-1w, NW flank Sparta discovery at Pine Prairie. Perf. 9,490-9,522 ft. and 9,540-70 ft. Comp. 2-20-44, 235 bbl. through 12/64-in. choke, TP 840 lb., gas-oil ratio 846, TD 10,816 ft.

ROCKY MOUNTAIN

New Tensleep Discovery Indicated in Wyoming

DENVER, Colo.—A new field in the Tensleep horizon has been opened on the Winkelman dome, Fremont County, Wyoming, in Stanolind Oil & Gas Co. 1 Shoshone-Arapaho, SW SE SW 18-2n-1w, 6 miles southwest of the Pilot Butte field. The top of the Tensleep was 2,878 ft., and a drill-stem test at 2,887 to 2,913 ft., open 1½ hours, showed 1,500 ft. of oil and no water. It was completed at 3,517

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ft., with the 7-in. cemented at 2,893 ft., and swabbed 40 bbl. an hour on the initial test, the oil being about 26 gravity, slightly better than the Pilot Butte crude. Winkelman is believed to be a comparatively small dome on a faulted anticline with approximately 125 ft. of closure. Stanolind purchased at auction lease on 960 acres in Sections 18 and 19 last August on a high bid of $25.60 an acre. Two wells were drilled on the same quarter as the discovery several years ago and showed for 3,000,000 cu. ft. of gas each in the Morrison at 945 ft., these being the only previous tests.

Saturated Tensleep at Steamboat Butte.—British-American Oil Producing Co. 2-C Tribal, NE NE SE 31-4n-1w, Steamboat Butte field, northwest of the Pilot Butte pool, Fremont County, Wyoming, is coring in the Tensleep at 7,015 ft., and was reported showing saturation at 6,960 ft. It had the top of the Embar at 6,443 ft., and on a drill-stem test showed 160 ft. of oil and cut mud, but no gas or water. The company has three producers in the Sundance and is making a deep test of this fourth well.

Little Grass Creek.—Continental Oil Co., C SE NE 11-46n-99w, a Tensleep test on Little Grass Creek, which is separated from the Grass Creek field at the southern end of the Big Horn basin by a narrow syncline, had streaked saturation in the top of the Tensleep. On drill-stem test at 6,110-31 ft., open 30 minutes, it showed 240 ft. of drilling mud, a little oil and no free water. It is coring ahead in green shale at 6,041 ft. The Embar at 5,849-64 ft. showed water.

Union of California wildcat.—Union Oil Co. of California has spotted its first Montana wildcat since reentering the Rocky Mountain area. It is on the Teton Ridge or Cordova structure, in Teton County, and the location is 1 William Asmus, CEL NE NW 4-23n-2w, in a 30,000-acre block.

COLORADO WILDCAT COMPLETION

St. Mary's, Huerfano County: S. W. Pressey 1 fee, CWL NW SE 3-27n-67w, lost hole at 1,250 ft., skidded rig 75 ft. and spudded in No. 1-A.

WYOMING WILDCAT COMPLETIONS

Garland, Big Horn County: General Petroleum Corp. 1 Howell Lot, 63-56n-97w, (approx. SW SE Sec. 32), TD 4,436 ft., 7-in. 4,302 ft., Tensleep 4,314 ft., swabbed 265 bbl. clean oil in 15 hr., waiting on pumping test, drill-stem test at 4,217-50 ft. in Embar, open 45 minutes, 8 bbl. oil-cut mud and water, top red beds 3,505 ft., elev. 4,010 ft.

Glendo, Platte County: Glentop Exploration Co. 1 Millikin, SE SE SE 18-30n-67w, dry at 1,335 ft. in red beds.

Little Buffalo basin, Park County: Fred Goodstein 1 Pedley-Government, NE NE NW 13-47n-100w, TD 4,965 ft., 7-in. 4,787 ft., top Tensleep 4,785 ft., completed last December and waiting on pump test, swabbed 135 bbl. in 24 hr.

Winkelman, Fremont County: Stanolind Oil & Gas Co. 1 Shoshone-Arapaho, SW SE SW 18-2n-1w, TD 3,517 ft., 7-in. 2,893 ft., top Tensleep zone 2,878 ft., swabbed 40 bbl. per hour, 26-gravity crude.

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ILLINOIS

The Texas Co. Opens a Pool In Jefferson County

CENTRALIA, Ill. — Twenty-seven oil wells and nine dry holes were completed during the week, with total initial production of 2,458 bbl., an average of 91 bbl. per well.

The Texas Co. 1 W. Green, E½ SE SE 15-1s-3e, a Jefferson County wildcat, uncovered production in McClosky lime. The well produced 120 bbl. per day on the pump after an acid treatment. The two other wildcats completed were dry.

Thirty-four new operations were reported, together with five wells being worked over. Seven wildcat operations were started.

ILLINOIS WILDCAT COMPLETIONS

Clark County: L. D. King 1 R. McKee, C E½ NE SE 8-9n-13w, dry at 610 ft.

Jefferson County: Texas 1 W. Green, C E½ SE SE 15-1s-3e, McClosky lime at intervals 2,762-2,856 ft., TD 2,862 ft., acidized, pumped 85 bbl. first 24 hours and 120 bbl. 3 days later. Discovery well.

Richland County: Mohawk Drilling 1 McNair, SW SW SW 33-3n-14w, dry at 3,137 ft., Palestine 2,238 ft., Cypress 2,797 ft., Benoist sand 2,953 ft., Aux Vases 3,036 ft., McClosky lime 3,068 ft.

PERMIAN BASIN

Casing Cemented in Yoakum County Wildcat Test

MIDLAND, Tex.—Casing was cemented in Helmerich & Payne 1 Higginbotham, wildcat test 5 miles west by north of the West pool, Yoakum County, and good saturation will be tested from that point to total depth of 5,214 ft. This wildcat topped the San Andres lime at 4,630 ft., with surface elevation 3,733 ft. Eight miles north of this wildcat, Hickok & Reynolds 1 Bain Price, bottomed at 5,301 ft., was plugged back to 5,280 ft., where it will make a test of a show of oil and gas logged from 5,345-48 ft.

Andrews County.—Signal Oil & Gas Co. 1 M. M. Fisher, Public School Lands Survey, at total depth of 4,628 ft., on 12-hour test pumped at the rate of 112 bbl. of oil per day. It was still testing.

Crane County.—John I. Moore 1 Barnsley, south of the Sand Hills pool, at total depth of 4,651 ft., pumped 47 bbl. of oil cut with 2 per cent water in 6 hours. On the northeast side of the Sand Hills pool, Magnolia Petroleum Co. 10 P. J. Lea, which has been producing from the lower Permian at total depth of 4,605 ft., where it was completed for 317 bbl. in December 1941, will be plugged back to around 3,200 ft. There a test will be made of the pay found in the new gusher of Gulf Oil Corp. 45 Waddell, northeast offset, which was completed last week for 11,731 bbl. from the McKnight pay.

Gaines County.—C. B. King and C. U. Bay 1 Blair, east side of the Wasson pool, which has been carried to the Clear Fork at total depth of 7,856 ft., had a good show of oil from 7,825-55 ft., and operators will make a test for production from this horizon.

Kent County.—Blackwell Oil & Gas Co. 1 House, 4 miles northeast of Gulf 1-B Swenson, in Garza County, was reported to be running about 160 ft. higher on top of the first lime than the Gulf well, which produced from the Pennsylvania before being plugged. The test was drilling below 2,140 ft. This wildcat is about 50 miles from present production, on a strike between the Sharon Ridge pool in Scurry County and the Nairn pool in Lubbock County.

Winkler County.—Assurance of another well from the Ellenburger in the Keystone pool was seen at Amon G. Carter C-3 Pure-Walton, north offset to the discovery. It topped the Ellenburger 85 ft. lower, but performed much the same on drill-stem test from 9,383-9,405 ft., when it made 8.28 bbl. of distillate in 15 minutes, accompanied by 10,000,000 ft. of gas volume per day. Another good well from the Holt zone of the Keystone pool was completed at Gulf Oil Corp. 12 Keystone, Section 10, Block B-2, Public School Land, which flowed 307 bbl. of oil and 27 bbl. of water through perforations at 4,775-92 ft., total depth 4,912 ft. Another old well south of this area will be deepened to the Holt zone in search of production. It is Falcon Co. 5 McCutcheon, total depth 3,600 ft., to be deepened to 5,000 ft.

WEST TEXAS WILDCAT COMPLETIONS

Reeves County: R. P. Champeau (was Chris Antone) 1 Biggs-Wilson, W. N. Holder Sur., near Culberson County line, dry at TD 2,872 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Humble Oil & Refining Co. 1 Federal-Leonard, 12-26s-37e, Lea County, was thought to be in the Silurian at total depth of 9,356 ft., but top of this formation had not been reported.

In the shallow-sand area on the southeast side of the Grayburg pool, Danciger Oil & Refining Co. 1 Friess became the fourth producer for the area when it was completed for 47 bbl. from pay at 1,995-2,057 ft. It was shot from 1,979 to 2,039 ft. Production

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limits of the Maljamar pool of Lea County were extended ½ mile north when Boller & Rutledge 1 Iles was completed for 40 bbl. pumping from 3,766-3,966 ft. at total depth. Operators have moved in on a west offset.

SOUTHEAST NEW MEXICO WILDCAT COMPLETIONS

Eddy County: Shuster & Messinger 1 Vickers, 24-20s-28e, dry at TD 987 ft.

LA.-ARK.

Pope County to Get Deep Arbuckle Lime Test

MAGNOLIA, Ark.—The geological department of the Stanolind Oil & Gas Co. confirmed rumors last week of the company's activities in northern Arkansas. Location has been made for the 1 Maxwell in the SE SE 18-8n-18w, some 15 miles east and north of Russellville in Pope County, and the contract depth is 5,000 ft., or to the Arbuckle. Considerable interest is shown in this test as the few wildcats drilled in north and northeastern Arkansas have been shallow gas tests.

ARKANSAS WILDCAT COMPLETION

Hempstead County: Barnsdall 1 James Brunson, NW NW 36-14s-25w, dry, TD 6,545 ft.

NORTH LOUISIANA WILDCAT COMPLETIONS

De Soto Parish: Superior Oil Corp. 1 Mansfield Hardwood Lbr. Co., SW NE NW 24-11n-11w, dry, TD 6,508 ft.

Madison Parish: C. H. Murphy et al 1 Sondheimer Co., SW NE SW 10-17n-12e, dry, TD 4,470 ft.

KANSAS

New Pool in Southwest Rooks County

CONTINENTAL OIL CO. 1 Brueggemann in NE NE NE 5-10-20w, swabbed 50 bbl. of oil per hour on test and opened the new Palco field in the southwest corner of Rooks County. The top of the Arbuckle lime is 3,823 ft.; 5½-in. casing was set at 3,824 ft. and the well was drilled to total depth of 3,843 ft. Cores were taken at 3,828-38 ft., and 3,838-43 ft., with the second core showing good saturation. The well was cleaned out, but neither shooting nor acidizing proved necessary and oil rose 2,600 ft., before swabbing was started. On depthometer test, the well showed a potential of 3,000 bbl. per day.

The new field lies on the trend of the Central Kansas uplift, between the Zurich pool to the southeast and the Morel pool to the northwest. The size of the first well and the fact that neither acidizing nor shooting was necessary, may indicate that an unusually prolific Arbuckle lime pool has been opened.

KANSAS WILDCAT COMPLETIONS

Barton County: Falcon-Seaboard 1 Beals, C N½ NE SE 22-19-15w, dry, TD 3,638 ft., Lansing 3,251 ft., Arbuckle 3,583 ft.

Cowley County: Grallup-McNish 1 Reidy, NW NE SW 15-32-7e, dry, TD 2,850 ft. Bartlesville 2,618 ft., chat 2,800 ft.

Ellsworth County: Phillips 1 Klema, NW NW NE 5-14-10w, dry, TD 3,658 ft., Lansing 2,793 ft., Arbuckle 3,618 ft.

Phillips 1 Urbanek, SW SW SE 7-15-8w, dry, TD 3,190 ft. Lansing 2,645 ft., Simpson 3,127 ft., Arbuckle 3,169 ft.

Cities Service 1 Campbell, NE NE SW 12-17-8w, dry, TD 3,511 ft., Viola 3,396 ft., Simpson 3,414 ft., Arbuckle 3,476 ft.

Greenwood County: Ward McGinnis 1 Nesbitt, NW NE SE 28-24-11e, dry, TD 2,040 ft., Mississippi 1,907 ft.

Marion County: Westgate Greenland 1 Ellers, C W½ SW SE, dry, TD 3,318 ft., Hunton 3,090 ft., Viola 3,278 ft.

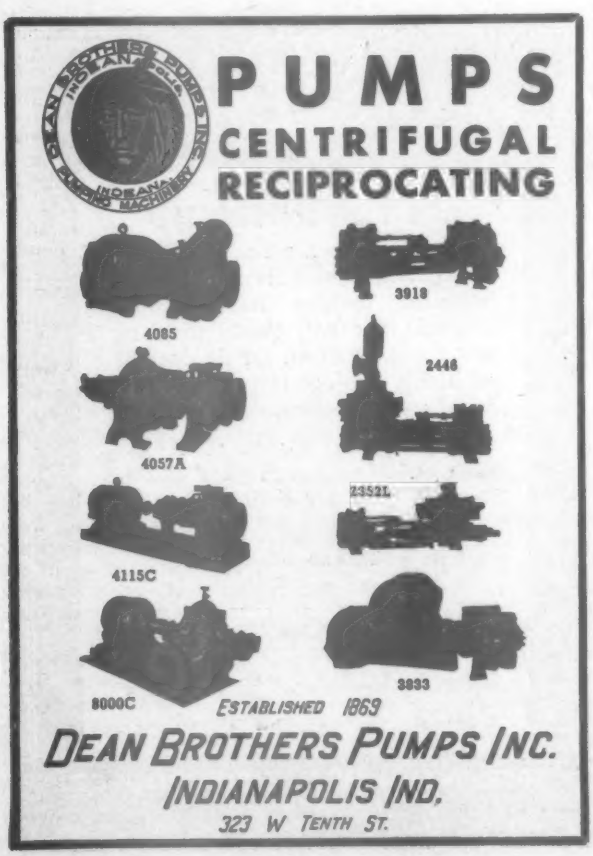
McPherson County: Bay Petroleum 1 Hoglund, SE NE 13-17-4w, dry, TD 3,488 ft., Mississippi 2,959 ft., Misener 3,389 ft., Viola 3,405 ft.

Reno County: R. & R. Drlg. 1 Blubaugh, NW SE 36-24-4w, dry, TD 4,095 ft., Simpson 3,995 ft., Arbuckle 4,075 ft.

Rooks County: Continental 1 Brueggeman, NE NE 5-10-20w, swabbed 50 bbl. oil per hour from TD 3,843 ft.

Russell County: Armer & Lassen 1 Olson, NE NE 27-13-13w, dry, TD 3,422 ft., Kansas City 3,057 ft., conglomerate 3,389 ft., Arbuckle 3,406 ft.

Stafford County: Atlantic 1 Niel, NW NE 27-24-14w, est. 20 bbl. oil and 30 bbl. water, TD 4,240 ft., cherty Viola 4,040 ft., Arbuckle 4,225 ft.



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Wildcat Completions and Discoveries

	Week ended March 4, 1944					Cumulative total for 1944				
	Oil	Distillate	Gas	Dry	Total	Oil	Distillate	Gas	Dry	Total
Ohio	0	0	3	0	3	0	0	6	11	17
Indiana	0	0	0	0	0	0	0	0	3	3
Kentucky	1	0	0	0	1	1	0	0	11	12
Illinois	1	0	0	2	3	4	0	0	50	54
Michigan	2	0	0	6	8	3	0	0	39	42
Kansas	2	0	0	10	12	9	0	0	62	71
Nebraska-Missouri-Iowa	0	0	0	0	0	0	0	0	0	6
Oklahoma	0	0	0	9	9	8	0	4	36	48
Texas:										
North Central	1	0	0	0	1	6	0	0	44	50
West	0	0	0	1	1	5	0	0	24	29
Panhandle	0	0	0	0	0	0	0	0	2	2
East	0	0	0	2	2	0	0	0	27	27
Gulf Coast	1	0	0	9	10	14	3	3	42	62
Southwest	1	0	0	4	5	8	2	5	40	55
Total	3	0	0	16	19	33	5	8	179	225
Louisiana:										
North	0	0	0	2	2	1	0	0	8	9
Gulf Coast	1	0	0	1	2	2	3	0	14	19
Total	1	0	0	3	4	3	3	0	22	28
Arkansas	0	0	0	1	1	1	0	0	10	11
Mississippi and Southeast	0	0	0	0	0	3	0	0	17	20
Montana	0	0	0	0	0	1	0	0	2	3
Wyoming	3	0	0	1	4	3	0	0	4	7
Colorado, Utah	0	0	0	0	0	1	0	0	2	3
New Mexico	0	0	0	1	1	0	0	0	11	11
California	0	0	0	3	3	1	0	4	24	29
Total United States	13	0	3	52	68	71	8	22	489	590
Total previous week	11	2	5	59	77					

NEW discoveries continue to maintain high pace of recent weeks, reflecting the intensive wildcatting campaign. Wyoming led the list with three new Tensleep discoveries, Michigan and Kansas each had two. One of the Kansas discoveries, Continental 1 Brueggemann in Rooks County, gave promise of being an unusually good Arbuckle lime pool. The Gulf Coast developed two new pays, Sunray 1 Joe Sklar found a new pay on the southwest flank of the Placedo field in Victoria County, Texas, while Hassie Hunt's Crowell-Spencer developed the first Sparta production on the northwest flank of the Pine Prairie field in Evangeline Parish, Louisiana. Northern Ordnance 1 L. R. Haney, 1 mile east of Woodbine, Cooke County, Texas, opened a new Strawn sand pool.

Wyoming's discovery, one of the largest completed last week, swabbed 265 bbl. of clean oil in 15 hours. This well, General Petroleum Corp. 1 Howell, in 63-56n-97w, Big Horn County, will not complete its potential tests until pumping equipment is moved in.

OHIO, KENTUCKY

Discoveries and Extensions Open New Gas Areas

ZANESVILLE, Ohio. — Three small gas discoveries were completed last week. James Upham's test on the Ohler tract in Lot 22, southeast part of Goshen Township, Tuscarawas County, drilled Clinton sand from 5,038-5,130 ft. with some gas in the top and bottom. The well was shot and shut in at 119,000 cu. ft.

Graber Oil & Gas Co. extended the Proctorville shale field 2½ miles to the north by a fair well on the O'Neil farm in Section 18, Windsor Township, Laurence County. Shale from 1,960-2,372 ft was shot and shut in at 196,000 cu. ft. Altier et al found 150,000 cu. ft. in a test, several miles from shallow production, on the Hivnor tract in Section 15, Deerfield Township, Morgan County. Drilling was stopped at 506 ft., 4 ft. in the Maxburg sand.

WILDCATS

Lawrence County, Windsor Township: Graber Oil & Gas 1 Thos. E. O'Neil, Sec. 18, shale 1,960-2,372 ft., 196,000 cu. ft. gas, TD 2,372 ft.

Morgan County, Deerfield Township: Altier et al 1 Hivnor, Sec. 15, Maxburg 502 ft., 150,000 cu. ft. gas, TD 506 ft.

Tuscarawas County, Goshen Township: Jas. Upham 1 S. A. Ohler, Lot 22, Clinton 5,038-5,130 ft., 119,000 cu. ft. gas, TD 5,192 ft.

EASTERN KENTUCKY

ASHLAND, Ky. — One oil well, three gas wells and one dry hole were listed in the week's report of drilling operations in eastern Kentucky.

Ware & Diederich 1 J. B. Clark, in Martin County, has an estimated daily production of 18 bbl.

The Kentucky West Virginia Gas Co. completed well 745 on the Adron Lowe tract on Johns Creek in Pike County at total depth of 1,584 ft. and reports a daily open flow of 1,356,000 cu. ft. of gas from the Maxon. The same company completed well 5,503 on the Spurlock Adkins land on Shelby Creek in Pike County at total depth of 1,972 ft. with a daily open flow of 440,000 cu. ft. of gas from the Maxon and 252,000 cu. ft. from Salt sand.

Hinkle & Ward completed well 2 on their tract near Milo in Martin County, with an open flow of 150,000 cu. ft. of gas. Well 1 on the same tract was a 250,000 cu. ft. producer.

Indian Creek Gasoline & Oil Co. hit a dry hole in well 11 on the Bruce Northcutt land in Menifee County.

WESTERN KENTUCKY

OWENSBORO, Ky. — Snowden & McSweeney 1 George Utley, 1 mile northeast of Robinsonville in Union County flowed 125 bbl. of oil in 3 hours, and was then shut in, as producers in the pool had agreed to limit well output to 125 bbl. per day. It was completed in McClosky lime at 2,658-67 ft., total depth. The lime was not acidized. Three good wells were completed in other parts of the county during the week, averaging about 176 bbl. per day per well, one producing from Waltersburg and three from Cypress sand.

Sinclair Prairie Oil Co. 1 Ashby, a Webster County wildcat, opened a pool 10 miles south of Henderson.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Webster County: Sinclair Prairie Oil Co. 1 Ashby, 10 mi. S of Henderson, Tar Springs sand 1,795-1,808 ft., TD 1,808 ft., swabbed 205 bbl. in 24 hours. Discovery well.

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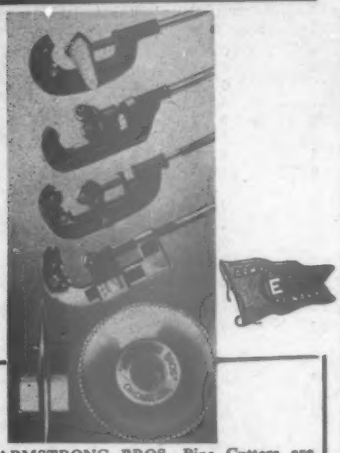

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Among the

Drilling Contractors

Helmerich & Payne, Tulsa, have two wildcat wells under way in Cochran County, Texas. Two and one-half miles northwest of the Sunray-Wright area, they are drilling on their own account No. 1 Della Slaughter Wright. In the western part of the county, they have contract to drill L. A. Douglas 1 R. E. Sherrill. In Yoakum County they have set casing at 5,150 ft. on their No. 1 Higginbotham wildcat, 5 miles northwest of the West pool. In Ward County, where they are drilling Stanolind Oil & Gas 1 Sealy-Smith, G&MMB&A Survey, which is opening a new Clear Fork lime pool, they will soon move 1 mile due east and drill 2 Sealy-Smith for the same operator.

Bridger Basin Oil Corp. will drill the William Moser 1 G. Brenner, in NW NE NW 23-3n-13w, Allegan County, Michigan.

Allen & Morris, of San Antonio, Tex., have been awarded the contract to deepen Union Producing Co. 2-A M. L. Rivers in the Agua Dulce field, Nueces County, Palo Alto grant. Rig has been moved to the location.

Loffland Brothers, of Houston, Tex., are rigging up at Pure Oil Co. 16 Alliance Trust on the southwest flank of the Gueydan field in Vermilion Parish, Louisiana. The new test is in 33-11s-1w and contracted to 10,000 ft.

Nicklos Drilling Co. of Houston, Tex., is moving in rig to drill Continental Oil Co. 5 Acadia Parish School Land, new test in the North Richie area of Acadia Parish. Louisiana. It is an 8,600-ft. test.

A. Ray Sarver will drill on contract the H. O. Butler 1 Fred Beach and H. O. Butler (Comm.), in E½ NW NW 33-11n-4w, Gratiot County, Michigan.

Bagley Drilling Co., Shreveport, La., has contract to drill Southern Oil & Gas Co. 1 E. P. Lee, 33-14n-13w, in the Holly Ridge field of DeSoto

Paul Amick, toolpusher, Manning & Brown, drilling contractors; Lee Neville, drilling foreman, Fred Goodstein, independent operator and contractor, Casper, Wyo.; R. J. Dilyer, geologist, and Don Jones, petroleum engineer, for Goodstein, and Fred Manning (rear), Manning & Brown, in Buffalo Basin field, in Wyoming

Parish, Louisiana. This is an 1,850-ft. test.

Manning & Brown, Denver, Colo., will move rotary rig currently engaged on an Arizona wildcat operation to Weld County, Colorado, where Ohio Oil Co. has already made location and built derrick for 1 Nordloh, SE SE 20-5n-63w, about 20 miles from the Greasewood field.

Penrod Drilling Co. of Dallas, Tex., will drill Hassie Hunt, Trustee, 7-C Crowell-Spencer Lumber Co., 23-3s-1w, in the Pine Prairie field of Evangeline Parish, Louisiana. It is a 10,000-ft. test.

Ervin Major will drill on his own account the 1 T. H. Welch, in SE SW SW 33-23n-9e, Iosco County, Michigan.

Lupher Drilling Co. has been awarded drilling contract on the Pure Oil Co. 2 Lloyd Stoner, in C E½ NW SW 8-14n-11w, Newaygo County, Michigan.

H. E. Wegener, contractor-operator in the West Edmond, Oklahoma, field, set a new fast-time record for drilling and completion in that field. The Wegener 1 Lenhart, in NW NE 5-13n-42, was spudded January 20, drilled to 6,930 ft., set 7-in. pipe 6,792 ft., was completed February 26, making 100 bbl. per hour through ⅝-in. choke on tubing.

Perry-Busk & Ormiston are the drilling contractors on the Clifford A. Perry 1 John D. Bloemers, in NW NW NE 11-6n-15w, Ottawa County, Michigan.

E. E. Cunningham, of Louisa, Ky., has completed a second gas well for Hinkle & Ward on their tract near Milo, in Martin County, Kentucky.

Glen Hatch, who for several years was with Ashby Drilling Co., and **Johnny Marrs,** formerly associated with Scott & Marrs, a drilling firm, have announced their intention to enter the rotary drilling business under the firm name of Hatch & Marrs.

Comanche Drilling Co. is rigging up rotary tools for a test in C SE SW SW 17-25n-3e, Osage County, Oklahoma, for Phillips Petroleum Co.

Arrow Drilling Co. is the drilling contractor on Sinclair-Prairie 1 Sarah Burks, in NE NW SW 23-3n-1w, Garvin County, Oklahoma.

Delaney & Osborne, drilling contractors on Fox & Fox 1 Curby, in SW SE SE 22-24n-2w, east of the town of Billings, in Noble County, Oklahoma, was drilling below 2,300 ft. Location is on a 1,600-acre lease block.

Ingling Drilling Co. has the contract on the J. M. Huber Corp. and Franco Central Oil Co. 1 Nelson, a newly staked wildcat in NE NE SE 29-15-1w, Saline County, Kansas, 4 miles north of the Hunter pool, on a block of 720 acres.

Wheless Drilling Co., Shreveport, La., has the contract to drill the Arkansas Louisiana Gas Co. 1 Pirtle, a new Trinity series wildcat test in Panola County, Texas, south of Carthage in the Graves Survey. The well is on the north end of a block of 19,000 acres assembled by the company, and the site is 2 miles south of the W. C. Feazel and Norman V. Kinsey 1 Ross, Moorman Survey.

Big Chief Drilling Co.'s head, W. T. Payne, has been named chairman of the oil and gas committee of the Oklahoma City, Okla., Chamber of Commerce.

Wynn Crosby Drilling Co. and Providence Oil Co. have made location for an 8,000-ft. wildcat in Harris County, Texas, which is scheduled to get under way next week. The test, 1 Bassett Blakely, is located in H.T. &B. Survey, Section 3.

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PERSONALS

Production Manager In West Coast Territory

E. W. MASTERS, formerly manager of the San Joaquin division of Shell Oil Co., Inc., at Bakersfield, Calif., has been transferred to Los Angeles and appointed to the position of production manager for the entire Pacific Coast territory. He replaces H. T. Wyatt, who resigned.

Masters, a graduate of Stanford University in 1918, has had varied and wide experience in the oil business. Just out of college, he engaged in mining in Colorado but by 1920 he had joined the Midwest Refining Co., now Standard Oil Co. (Indiana), to embark on his career in the oil industry. While with Midwest he worked principally in the Salt Creek field of Wyoming. In 1921 Masters returned to California to join the Ventura Consolidated Oil Co., later taken over by the California Petroleum Corp. operating in the Santa Paula-Fillmore district.

At midyear 1926, he transferred to the Shell organization, whereupon he was sent to the Netherlands East Indies to work on production problems. He returned to California in 1927 and since then he has worked his way upward in the Shell organization through the positions of production engineer, production superintendent, division superintendent at Oilfields, Ventura, Bakersfield and, finally, manager of the San Joaquin division which position he left to become the new production manager.

Masters was born in Portland, Ore., is married and has two children, a boy and a girl.

Earl K. Nixon, Portland, Ore., was elected president of Association of American State Geologists, which met in Washington, D. C., last week. **Robert H. Dott,** Norman, Okla., was chosen vice president.

L. B. Simmons, chairman of Rock Island Refining Co., Duncan, Okla., has been reelected chairman of Associated Refineries, Inc., which is building an aviation-gasoline plant near Duncan under government sponsorship. **M. L. Freese,** Tulsa, is president; **R. B. Anderson, B. I. Lubell** and **R. C. Stanford** are vice presidents; **Dr. H. B. Alspaugh** is secretary-treasurer; **C. D. Cund** and **A. I. Anson,** assistant secretary-treasurers.

Maj. Willard J. Classen, Army Air Corps, has been placed on the inactive list and has returned to the oil industry after 20 months' service in the armed forces. He has been appointed chief geologist of Wilshire Oil Co. and affiliated companies and in his new capacity will maintain headquarters and residence in Bakersfield, Calif.

Dr. W. W. Rand, geologist, is in charge of an office which Shell Oil Co., Inc., has opened in Tallahassee, Fla.

F. C. Ruff, General Petroleum Corp.'s first chemist back in 1914, and recently senior chemical engineer, has retired.

Wilbur E. Larson, junior engineer in the natural-gas department of the coastal division, California, for Shell Oil Co., Inc., has been made operating assistant in the absorption plant in the same division. **Leonid V. Leonard,** engineering draftsman at the Wilmington refinery, has been promoted to production engineer in the Los Angeles office.

Willard Gill, formerly with Pure Oil Co. in Fort Worth, Tex., and vice president of Fort Worth Geological Society, has joined Hunt Oil Co. as geologist for the southeastern United States, with headquarters in Jackson, Miss.

C. H. Ervin, Humble Oil & Refining Co., Abilene, was elected president of West Central Texas Oil Scouts Association at a recent meeting in Abilene; **G. A. Plummer,** Lone Star Producing Co., Eastland, first vice president; **W. A. Maloney,** Gulf Oil Corp., Breckenridge, second vice president; **Martin F. Muench,** The Texas Co., Abilene, secretary-treasurer.

Nathan O. Corman, who was an engineer for Magnolia Petroleum Co. until he entered war service, has been promoted from major to lieutenant colonel in the Army Corps of Engineers, on duty in the India sector of the China-Burma-India theater. Colonel Corman, a graduate of Texas A. and M. College, from which he received a reserve officer's commission, was particularly well known among oil operators in fields of East Texas and North Louisiana.

Bert Devere, president of Pathfinder Petroleum Co., is serving as secretary of the marketing committee for District 5, Petroleum Administration for War, following the resignation of **Ray Varnum,** who is now handling manpower problems in the Los Angeles headquarters of PAW.

E. R. Atwill, research geologist of Union Oil Co., with offices at the headquarters of the company in Los Angeles, Calif., has been elected president of the Branner Geological Society, formed over 20 years ago by California geologists.

E. B. Wharton, petroleum engineer in the Haynesville, La., division of The Ohio Oil Co., has been transferred to the Rocky Mountain division.

James M. Baggs, assistant chief chemist for Husky Refining Co., has been transferred from Cody, Wyo., to Ogden, Utah.

Dalton H. Cobb is now scout for The Texas Co. in New Mexico, taking the place of **E. H. Gaither,** who was put on the West Texas district to succeed **Gene Price,** advanced to landman.

Lt. Col. M. G. Lasso, formerly plant superintendent for Standard Oil Co. (Indiana) at Eau Claire, Wis., is now a member of Gen. Dwight Eisenhower's staff in the European theater

of war operations. As chief of transportation in the petroleum section of Allied force headquarters, he is responsible for the movement of petroleum products by water, rail and highway; for maintaining tanker positions and routing to ports.

H. W. Davidson, Davidson Drilling Co., with offices in Fort Worth, Odessa and Seagraves, Tex., was recently made vice president and general field superintendent of the firm, which has been operating in West Texas and southeastern New Mexico for the past 15 years. He started work for the firm during summer vacations while he was attending Texas A. & M. College, from which he graduated in 1935, and has been on every job connected with rotary and cable-tool drilling and production. He resides in Odessa.

H. H. Brown has returned to the pipe-line department of The Ohio Oil Co. at Bridgeport, Ill., after almost a year with War Emergency Pipe Lines, Inc.

T. E. Swigart, president of Shell Pipe Line Corp., Houston, Tex., has resigned as national chairman of the American Petroleum Institute's committee on standardization of pumping equipment and engines, because his duties no longer are directly concerned with production problems. **H. N. Marsh,** of General Petroleum Corp., Los Angeles, Calif., now vice chairman, succeeds to the chairmanship.

Albert Gregersen, on leave from the geological department of The Texas Co. to serve as district geologist in District 5, Petroleum Administration for War, has been elected chairman of the wildcat committee of California Oil and Gas Association, succeeding **L. L. Aubert,** of Bankline Oil Co. Gregersen is a past president of the Pacific section of American Association of Petroleum Geologists.

Adam Alexander, formerly an independent oil operator in Oklahoma, has joined the land department staff of Phillips Petroleum Co. in Midland, Texas.

Robert R. Thompson, geologist recently for Snowden & McSweeney Co. and formerly geologist for Danciger Oil & Refining Co., has become associated with Hill & Hill, Fort Worth, Tex., independent operators.

S. F. Bowlby, manager of the Los Angeles, Calif., division of Shell Oil Co., Inc., has been made manager of the San Joaquin division to succeed **E. W. Masters,** recently named production manager for the entire Pacific Coast area. **A. S. Baptie** takes Bowlby's place.

H. C. Fownes II, Pittsburgh, Pa., president of The Shamrock Oil & Gas Corp.; **L. F. Rains,** Pittsburgh, president of A. M. Byers Co., and **O. Kelley Anderson,** Boston, Mass., director of United Corp., have been chosen to fill three vacancies on the board of directors of Columbia Gas & Electric Corp.

Howard B. Bradley, of Dallas, Tex., petroleum engineering student at University of Texas, has begun work under a $900 Stanolind Oil & Gas Co. fellowship for study of drilling mud in oil fields. Renewing the fellowship recently, the company increased the amount from $600 to $900 annually.

Henry B. Malone, director of purchases for Sinclair Refining Co., was elected a vice president last week.

Henry W. Fuellhart, for the past 2 years assistant to the director of production in District 1, Petroleum Administration for War, has opened an office in Tidioute, Pa., as a consultant in petroleum and civil engineering. Following his graduation from Pennsylvania State College in 1933, Fuellhart for 4 years was chief engineer and geologist for Clinger Oil & Gas Co. in Tidioute. He spent 5 years in the Army Engineering Corps at Pittsburgh, Pa., before joining PAW 2 years ago.

John S. Ball and **Walter I. R. Murphy,** chemists in the U. S. Bureau of Mines at Laramie, Wyo., have been given salary raises and awards of excellence for inventions and suggestions saving time and money. Ball developed a system of analysis to determine types of sulfur compounds in petroleum distillates. Murphy devised a rapid method to determine natural and potential toluene in petroleum.

Gordon Gray, Humble Oil & Refining Co., has been transferred from New Orleans, La., to Midland, Tex., as assistant district landman under **Walter Collyns.** He replaces **J. C. Cunningham,** transferred to Tampa, Fla. as district landman.

M. J. Bonham, who has been general land man for Continental Oil Co. in its Fort Worth, Tex., office, has been made district land man for a new office which Continental has established in Tyler, Tex. Bonham joined Conoco 18 years ago, going to

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M. H. Bush, petroleum adviser, Kansu Petroleum Administration; Y. C. Tung, Chinese National Resources Commission; Capt. Tex Bradford, and A. H. Chapman, United Geophysical Co., were among the guests at a recent meeting of the New York Nomads. The first three named were speakers at the meeting

Fort Worth in 1936 from Houston, Tex. He previously had served with Gulf Oil Corp. and various independents in California. **W. A. Rounds,** general engineer at Houston, has been moved to Fort Worth. He has been employed by the company 18 years. Rounds will be assistant land superintendent and engineer. **George N. Ely,** formerly geologist in the district office at Midland, Tex., will go to Tyler with Bonham as district geologist. He joined Continental Oil Co. 8 years ago after graduating from University of Colorado.

Gilbert Brown, Seaboard Oil Co. geologist at Corpus Christi, Tex., has been transferred to Midland, Tex., taking the place of **Earl Westmoreland,** transferred to Tallahassee, Fla., **Ed Dawson** will join the Midland staff as scout for Seaboard, coming from Mt. Vernon, Ill.

C. C. Muth has been made production superintendent for Rowmor Corp., Mount Pleasant, Mich., succeeding **Dan Roach,** who resigned recently. Muth was toolpusher several years for J. C. Arthurs, Inc., which has discontinued operations.

B. J. Taylor, vice president and head of the land department of Kingwood Oil Co., Okmulgee, Okla., has returned to Evansville, Ind., following a month in Mississippi.

Fred Turner, of Mount Pleasant, Mich., head of Turner Petroleum Corp., has been elected president of Bay Refining Co. of Saginaw, Mich., and vice president of Bay Pipe Line Co. purchasing and transportation affiliate. Turner succeeds **James C. Graves** of Saginaw, in both offices of the two companies. **Edward Stewart,** of Mount Pleasant, head of Stewart Oil Co., is president of the pipe line and vice president of the refining companies. **Edward Reiser,** of Saginaw, executive vice president and general manager of the two companies, continues in the same capacities under the reorganization, and also becomes treasurer, and a director, replacing Graves. **T. G. Caley,** of Lapeer, Mich., continues as a director, but Reiser assumes the position of treasurer and **Kenneth Patterson** becomes secretary of the two companies, both positions formerly being held by Caley. **Robert Humpheries** was named assistant treasurer of the refinery and **Ann Boyer** was made assistant treasurer of the pipe line.

T. A. Norman, Sr., formerly chief operator at Gulf Oil Corp.'s gasoline plant at Overton, Tex., has been made district gas engineer, with headquarters in Kilgore, Tex.

Lawrence J. Finfrock, who has joined Carter Oil Co.'s engineering staff at Billings, Mont., was formerly a junior engineer at the Benbow Mine, Dean, Mont.

C. H. Gerdes, formerly with Socony-Vacuum Oil Co. in Caracas, Venezuela, has joined Petroleum Administration for War as a specialist in foreign oil production.

A.P.I. Production Meeting To Be Held in Columbus

COLUMBUS, Ohio.—The eastern district conference of the American Petroleum Institute's Division of Production will be held April 13-14 in the Deshler-Wallick Hotel, Columbus. W. E. Ferguson, the Ohio Fuel Gas Co., Columbus, is general chairman.

The preliminary program includes: "Oil Around the World," L. G. Huntley, Huntley & Huntley, Pittsburgh, Pa.; "Unitized Compressor Station"—Reciprocating Type, Paul Dufendach, Kentucky-West Virginia Gas Co., and Rotary Type, George W. McKinley, Hope Natural Gas Co.; Sidney A. Swensrud, vice president, Standard Oil Co. (Ohio), subject to be announced; "Methods of Sand Study in the Appalachian Basin," Dr. R. E. Sherrill, University of Pittsburgh, and D. A. Busch, Pennsylvania Geological Survey; "Review of Developments in Southeastern United States," Hugh Brankstone, Gulf Oil Corp.; "Present and Future Trends in Automotive Fuels," Dr. C. E. Boord, Ohio State University; "Some Recent Advances in Well-Treating Methods and Equipment," P. E. Fitzgerald, Dowell, Inc.; "Gas Storage," W. A. Dahlgren, Interstate Oil Compact Commission, Tulsa

Market Developments

IMPROVED transportation conditions reported this week in most sections of the country east of the Rocky Mountains indicated that production and demand will be brought more nearly in balance within a relatively short time. Completion work on two major pipe-line systems from West Texas is under way. Increased deliveries of crude oil to the big-inch line and to interior refining centers will modify some of the more critical maladjustments apparent during the past 5 or 6 weeks.

The East Coast supply situation, which had been described as becoming dangerously tighter in statements issued by the Petroleum Administration for War at Washington, was found to be "somewhat better than a month ago" by the economics subcommittee of the Petroleum Industry War Council. The PIWC report substantiated indications contained in the recently suspended A.P.I. index of civilian supply on the East Coast.

The improvement indicated in the PIWC report was based on the inauguration of deliveries by the 20-in. products line this month and a further increase in tank-car shipments. According to this report, between 125,000 and 150,000 bbl. per day of heating oil will be delivered to the East Coast this month. Tank-car deliveries are expected to average 720,000 bbl. per day, an increase of fully 25 per cent from the seasonal low in the week ended December 25, 1943.

Furthermore, the PIWC committee found indications that tanker deliveries to District 1 in March would average 50,000 bbl. more per day than in previous months and with big-inch and tank-car deliveries would make possible crude runs of 780,000 bbl. per day. This is a volume greater than the combined prewar capacity of all East Coast refineries.

With the end of the normal heating season only 3 weeks away, it is, therefore, virtually certain that no severe shortage of burning products will develop. However, while the heating-oil issue has been met, the matter of meeting demands for gasoline during the coming summer looms as a more difficult problem in view of the existing low level of stocks.

A marked upsurge in demand for regular-grade gasoline from buyers in District 2 was reported by Mid-Continent refiners and marketers. An explanation offered was that this material is wanted for use as tractor fuel.

Most of the product designated as tractor distillate is being shipped to the East Coast, refiners said. The supposition is that this material, which has specifications close to those for kerosene, is being utilized as a burning oil. Kerosene continued extremely tight. Demand for virtually all products exceeded the supply.

Shortage of tank cars was still a problem, but it was believed that the promised early opening of Great Lakes navigation would help to ease the transportation situation.

The outlook remains dark for civilian motor-fuel supplies on the Pacific Coast. Stocks have shown a temporary increase because of inclement weather. Inventories, however, are not rising in keeping with consumption and production, indicating that military requirements are essentially in line with previous forecasts. Increased production of California crude oil through relaxation of the maximum-efficient-rate factor will not be sufficient to harmonize production and consumption.

A.P.I. Refinery Report

Week Ended February 26, 1944

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	161	3,356	403	1,209
Ind., Ill., Ky.	765	19,077	2,964	6,007
Okla., Kan., Mo.	337	8,152	1,238	1,590
Censored area*	2,193	37,164	14,849	15,156
Rockies	99	2,056	598	384
California	823	15,443	31,335	9,411
Total 2-26-44	4,377	85,248	51,387	33,766
Total 2-19-44	†4,404	83,931	†51,948	†33,809
Total 2-27-43	3,683	92,772	70,516	35,891

*Reports combined on East Coast, Texas Gulf Coast, Louisiana-Arkansas and Inland Texas at request of PAW. †Revised.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
February 26, 1944	237,137,000
February 19, 1944	237,511,000
February 27, 1943	235,217,000

*Excludes unrefinable stocks in California.

REFINERY PRICE SUMMARY

(Prices as of March 7, 1944)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	80†	72-74	68-70	63-66
Mid-Continent*	‡6.00-6.25	5.750-6.000	.....	5.626
Gulf Coast	6.00-6.50	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	9.2	9.2	.....
California	.....	6.255-6.500	5.750-6.125	5.125-5.500

*Basis Group 3. †1939 C.F.R. (research method). ‡Inland Texas and adjoining counties in Arkansas and North Louisiana. §Unleaded.

KEROSENE AND DISTILLATE FUEL OIL

Product:	Kerosene†	No. 2	No. 3	No. 5	No. 6‡
Mid-Continent*	4.125-4.375	3.500-3.625	3.375-3.500	$0.85	$0.80-1.27
North Louisiana*	4.125-4.375	3.500-3.625	.....	.....	0.80-1.27
Pennsylvania	6.000-6.125	5.875-6.000	.....	.....	.....
California	4.500-5.500	5.500	5.500	§1.10-1.25	§1.10-1.15
Northeast Coast	6.200	6.700	6.700	1.95	1.85
Gulf Coast	4.125	3.750-3.875	.....	1.35	0.85

*Reflecting OPA ceilings, depending on destination of shipments. †Quotations for 41-43 gravity. ‡Range depends on gravity. §Pacific Specification 300. ¶Pacific Specification 400

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

LUBRICANTS

PENNSYLVANIA GRADE—	
Bright stock,* 10 pour point	30.5
Bright stock,* 25 pour point	25.0
Steam refined, 600	15.0
Neutral oil,† 10 pour point	34.0
Neutral oil,† 25 pour point	28-32.5
*No. 8 color, 145-155 at 210, 540-550 flash. †150 vis. at 70° F., 3 color, 400-405 flash.	
MID-CONTINENT—	
Bright stock, 150-160 D, 0-10	23.00
Neutral oil,‡ 200-3	15.00
‡0 to 10 pour point.	
GULF COAST—	
Pale oil, 200-3	8.75
Pale oil, 500-3½	10.00

WAX

Oklahoma, 124-126, w.c.s.	4.250
Pennsylvania, 122-124, w.c.s.	4.250
NEW YORK (in bags)—	
Refined, 130-133 (A.m.p.)	7.00
Crude, 124-126 (W.s.)	6.00

TANK-WAGON PRICES

(Gasoline prices based on regular grades in cents per gallon.)

	Dealer tank wag.	Combined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.5	10.5
New York	16.10	5.5	10.1
Philadelphia	16.20	5.5	11.9
Washington, D. C.	15.20	4.5	11.3
Chicago	14.10	4.5	10.6
Cleveland, Ohio	14.80	5.5	*9.9
Atlanta, Ga.	16.90	7.5	*11.5
Denver, Colo.	14.50	5.5	11.0
San Francisco	14.80	4.5	11.3
Tulsa	16.30	7.0	8.3

*Includes 1-cent state tax.

Equipment Progress

Lincoln Announces New Model Engine-Driven Arc Welder

A new "Shield-Arc" engine-driven welder at 200 amp. of light weight, rugged construction with powerful

enclosed, rubber mounted engine of 29 hp., is announced by Lincoln Electric Co., Cleveland, Ohio.

This new unit, supplied complete with base and canopy has a current range of 40 to 250 amp. Dual control of welding current is accomplished by adjustment of series fields and generator speed.

For metallic arc welding, with bare or coated electrodes, the new model also supplies uniform welding current for carbon arc welding.

The generator control or "job selector" assures accuracy of open-circuit voltage and permits precise control of engine speed of from 1,500 to 1,150 r.p.m. for welding. In addition, this control may be used to manually reduce the engine speed to as low as 750 r.p.m. whenever it is necessary to stop welding at intervals of a few minutes. This feature not only permits adjustment of engine speed to fit the individual job, but also affords improved welding and keeps down fuel consumption and engine wear.

With this new unit an engine speed of from 1,150 to 1,400 r.p.m. is used for the majority of welding applications, being considerably lower than that of conventional engine-driven welders thus assuring longest possible life of the equipment.

The generator can produce its rated current of 200 amp. when the "job selector" is set so that the machine operates at speeds as low as 1,200 r.p.m.

Weight of the unit as illustrated is approximately 1,130 lb. Over-all length, 65¼ in.; width, 24 in. and height, 42½ in.

Gross Supply Co. Bucyrus-Erie Distributor

Appointment of Gross Supply Co., El Dorado, Kans., as distributor for Bucyrus-Erie oil-well spudders was recently announced by Bucyrus-Erie Co. of South Milwaukee, Wis.

The company will handle the Bucyrus-Erie 24-L and 36-L spudders in a territory which embraces all of the State of Kansas except the counties of Stanton, Grant, Haskell, Gray, Meade, Seward, Stevens and Morton.

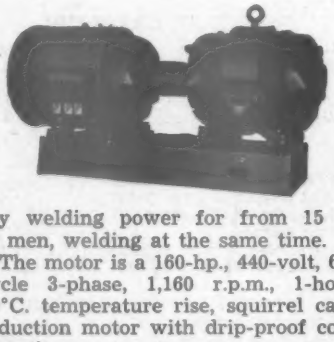
Headquarters of Gross Supply Co. are at 605 South Main Street in El Dorado.

Quigley Moves Offices

Quigley Co., Inc., announces removal of its general offices to new enlarged quarters at 527 Fifth Avenue, New York 17, N. Y. The new offices are located in the Bankers Trust Building, at the corner of Forty-fourth Street.

Century AC to DC Motor Generator Set

The Century AC to DC motor generator set, manufactured by Century Electric Co., St. Louis, Mo., will sup-



ply welding power for from 15 to 30 men, welding at the same time.

The motor is a 160-hp., 440-volt, 60-cycle 3-phase, 1,160 r.p.m., 1-hour 50°C. temperature rise, squirrel cage induction motor with drip-proof construction.

This motor drives a 70-volt, 1,500-amp., flat compounded, direct current generator, rated 1 hour 50° temperature rise.

These machines are capable of being operated in parallel, when large quantities of power are required.

Combination Gun Perforator And Production Tester

Through combining a gun perforator and production tester into one unit which both perforates the casing and gives an accurate gage of the productiveness of a zone on a single run into the well, McCullough Tool Co., 5820 South Alameda St., Los Angeles, Calif., is enabled to offer a new time- and money-saving service to the oil industry. The gun casing tester is run on drill pipe or tubing, and accurate pipe measurements are utilized to assure the location of the perforations in the exact zone designated for testing.

The gun tester consists of a production tester with a gun perforator attached below it. The gun perforator may be a short unit for firing one to four shots, or it may be a standard gun which shoots 10, 20 or 30 shots in a 5-ft. section. A number of guns may be joined together to cover the extent of the zone to be tested.

Operation of the gun tester is both quick and easy. When the gun tester is stationed at the zone to be tested the gun is fired and the control head or christmas tree attached to the production string. The tester is then raised and set above the perforated area and the sample-taking valve is opened. Setting the tester isolates the zone being tested from the hydrostatic pressure so that the test is made under formation pressure only and before the zone can be contaminated by the well fluid. This insures an accurate gage of the productiveness of the zone. When a number of zones are to be tested, the uppermost zone is tested first and the others in succession, working downward. Thus, no plugs or squeeze jobs are required between tests and much time and expense are saved.

In addition to its use in testing for oil production, the gun tester is widely used in testing for water shut-off

and in determining the success of squeeze-cementing operations. The tool may be run with or without a water cushion, and, due to its design, it releases easily after the test, whether wet or dry.

Trade Literature

National Carbon Co., Inc., Carbon Products Division, Cleveland, Ohio—Catalog section M-8000, covering the industrial applications of National and Karbate carbon and graphite products. The 16-page folder is copiously illustrated.

Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., Passaic, N. J.—Fiftieth Anniversary Catalog, a 140-page anniversary edition of "Manhattan Rubber Products for Industry." Described in this new catalog are hundreds of mechanical rubber products and many other special items manufactured by Manhattan. The catalog also contains a brief history of the company.

Taylor Instrument Companies, Rochester, N. Y.—A 24-page bulletin, "The Taylor Guide to Correct Instrument Selection," covering briefly the company's entire instrument line. The bulletin is divided according to the variables to be measured or controlled. The final pages are devoted to special-function instruments. The bulletin is No. 98170.

Among Equipment Men

Farrel-Birmingham Appoints Personnel Director

Farrel-Birmingham Co., Inc., of Ansonia, Conn., announces the appointment of Albert W. Hendrickson as director of employe services, in charge of employment, first aid, training programs, employe magazine, cafeterias, and other personal activities, at the company's three plants at Ansonia and Derby, Conn., and Buffalo, N. Y.

Hendrickson comes to Farrel-Birmingham Co. from Kellett Aircraft Corp. of Philadelphia, Pa., where he was director of industrial relations. Prior to that he had been associated with Collins & Aikman Corp. as production superintendent and in other capacities.

Pate Joins Schabarum in Machine-Shop Operation

Don Pate, Tulsa, division sales manager for National Supply Co., has resigned to become associated with Bruno Schabarum in the operation of an oil-field machine shop at Odessa, Tex.

Visit South America

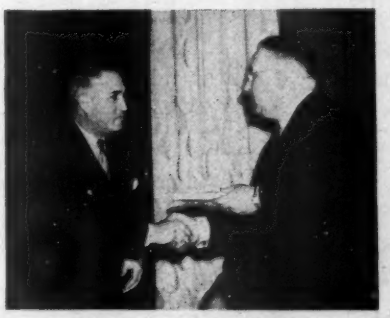
W. J. Campbell, president of Petroleum Machinery Corp., left New York February 20 for a business trip to Trinidad where he will visit the fields and oil centers of these countries. He was accompanied on his trip by C. W. McKee of Canadian Industrial Minerals, Ltd. They are making this trip entirely by air and will return to the States in the middle of March.

Philadelphia Gear Works Promotes Four Men

Philadelphia Gear Works, Inc., Erie Avenue and G Street, Philadelphia, Pa., has named James N. Morrell as sales manager of Limitorque valve control division, and Thomas V. Withington has relinquished his position as chief engineer to become assistant sales manager of Limitorque division. He in turn has been succeeded as chief engineer by William F. Plume. Robert E. Richards has been appointed assistant chief engineer.

Heath Leaves Westinghouse

Russell D. Heath, manager of petroleum and mining sales for Westinghouse Electric International Co., has resigned to organize his own company which will offer an engineering



sales service for a line of equipment for the refining, producing, pipe-line and mining industries for both foreign and domestic operations. A farewell party was given him by his associates at Westinghouse where he was presented with a watch. John W. White, general manager of Westinghouse Electric International Co., made the presentation.

Mr. Heath was connected with Westinghouse for 20 years during which time he traveled extensively in foreign oil fields, with frequent trips to all important domestic areas. At present he represents Russell & Stoll Co., Inc., with additional lines to be announced.

Jenkins Heads Marley's Houston Division

Marley Co., Inc., of Kansas City, Kans., manufacturer of cooling towers and spray nozzles, has established a new divisional office at 2006 Esperson Bldg., Houston, Tex., to provide immediate and direct sales and service coverage of the Texas Gulf Coast, Northwestern Louisiana and Southwestern Arkansas. The new office adds its increased facilities to those in Dallas, Corpus Christi, San Antonio, and El Paso, Tex., where the company's representation remains unchanged.

Ray T. Jenkins, formerly in charge of the Tulsa divisional office, heads the Houston division. Jenkins joined the Marley organization in 1933 and represented the company in Dallas for 3 years before assuming direction of the Tulsa territory in 1937. He is well known in mechanical engineering, industrial and air-conditioning circles throughout Texas, Oklahoma and Arkansas.

New Oceco Representative In Chicago

The Oceco Division of Johnston & Jennings Co., Cleveland, Ohio, manufacturers of the Oceco line of vent valves, flame arresters, gage hatches, manheads, and other vapor-conservation, fire-protection and tank fittings, has announced the appointment of General Meters & Controls Co., 205 West Wacker Drive, Chicago, as representatives in the Chicago territory.

Trail Returns to Dallas For Hyatt Bearings

James A. Trail, who formerly represented the Hyatt Bearings division of General Motors Corp. in the oil country, is again located in Dallas, Tex., and will represent the company from that city as headquarters. During the past year he traveled out of Chicago and Detroit, where he handled special assignments in connection with the war effort.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE

8 CENTS A WORD, minimum charge $2 per insertion.

SITUATIONS WANTED, 4 cents a word, minimum charge $1.

BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.

10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.

All classified advertising payable in advance.

DISPLAYED—PER INCH

Classified display advertising set in single or double column style:

1 inch	1 time	$7.00
1 inch	13 times	6.50
1 inch	26 times	6.00
1 inch	39 times	5.50
1 inch	52 times	5.00

Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE 9:00 A.M. MONDAY
Published Each Thursday

EXPLORATION

GRAVITY Meter Party available about April 15, 1944. Seismograph Party about July 15, 1944. Box C-173, The Oil and Gas Journal, Tulsa, Okla.

ROYALTIES

OIL AND GAS ROYALTIES for sale in Western Kentucky Coal Basin. Now leased to large producing company. For prices and particulars, write Box C-167, The Oil and Gas Journal, Tulsa, Okla.

B. F. REYNOLDS
Oil and Gas Royalties, 1004 Ross Ave., Pittsburgh (21), Penna.

BUSINESS OPPORTUNITIES

MANUFACTURING FACILITIES AVAILABLE

Midwestern manufacturing concern, now devoting its efforts to war production, with knowledge and facilities to produce oil field specialties will entertain any propositions to manufacture such items. Box C-198, The Oil and Gas Journal, Tulsa, Okla.

WANTED

WANTED

GAS RECYCLING PROJECT

By large independent having available new, complete compression equipment capable of handling large volume and high pressures. Interested in high pressure wet gas area, good gasoline content, good reserves, sufficient wells already drilled for a recycling operation. Prefer project with gasoline extraction plant already operating but with limited market for residue dry gas. Give all information possible first letter. P.O. Box 1914, Fort Worth, Texas.

OIL REPORTS

OIL REPORTS
SOUTH GEORGIA
6 month sub. $6.00
C. W. Deming—Publisher
Waycross, Georgia
20 years operating out of Tulsa

FINANCING

CAPITAL SEEKERS — Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit 1, Mich.

CAPITAL inexpensively raised. Write for our proposition today. No charge for consultation. Address: Service P.O. Box 165, Chicago 90, Ill.

LEASES AND DRILLING BLOCK

2,000-ACRE lease in proven field in Rocky Mountain District; drillers attention; immediate drilling wanted. V. D. Tidball, Faith, S. D.

FOR SALE: Oil and gas leases and small production, located in Southwestern Kentucky, near drilling and producing wells. W. P. Harley, Bowling Green, Ky.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma
Louisiana and Illinois.
Inquiries Invited.

B. D. BUCKLEY
60 Broadway Drive, Clayton
St. Louis, Mo.

LEASES AND DRILLING BLOCKS

160-ACRE lease H. & T. C. Railroad Section 31, Chambers County, Texas. Five year commercial. Ten dollars acre. Wayne S. Lawrence, 604 Sterling Bldg., Houston, Texas. Phone C 1807.

NEW MEXICO
STATE OIL AND GAS LEASES

Humble Oil & Refining Co., now drilling a scheduled 7,500 foot test. Other major oil companies own lease blocks near test. I offer 40 acres and multiples thereof in same area. Write for information. HARRY S. WRIGHT, New Mexico State Leases, Farmington, New Mexico.

LUBBOCK County Lease for sale. W½ Sc. 43, Bl. P, offsetting location made in NW¼ Sc. 44, Bl. P. for new oil test NW Lubbock County. C. L. Craig, Perryton, Texas.

KARNES COUNTY, TEXAS — For Sale: 2,500 acres checkerboard leases across county. Six new fields discovered in this county in 1944. Ed Houlihan, Box 444, Beeville, Texas.

WYOMING AND MONTANA, the next big oil fields. Have blocks on big structures, will drill. You can get in ground floor today. Wire or write. P.O. Box 273 Denver, Colo.

ARKANSAS-Louisiana-Texas leases twenty acres up. Dollar acre up. Owners Box 1122, Little Rock, Arkansas.

MUCH MORE shallow high-grade oil remains to be produced in Kentucky. See me for suitable structural locations, and fast economical method of drilling and producing without pumping wells. N. M. Sauls, Geologist, Cookeville, Tenn.

WEST TEXAS — New, long term leases, lowest price, cheapest rentals, large or small tracts. Do you have block anywhere you want drilled, OR do you want block to drill. Information and maps write: F. L. Welch, 1711 Roosevelt Ave., San Antonio, Tex.

FOR SALE: Oil lease on choice Florida oil land, also mineral rights. Write owner, R. R. Starnes, P.O. Box 7, Orlando, Fla.

WANTED, from landowners, brokers or attorneys, fee lands, leases, royalties, any size deal, West Texas, and elsewhere Texas, New Mexico, Okla., Ark., La., Miss., Ala., Ga., Fla. Give price and description. American Oil Co., P.O. Box 1042J, Houston, Tex.

A WORTHWHILE OPPORTUNITY

We own properties in California, Illinois, Indiana, Kansas, Louisiana, Nebraska, Oklahoma, Texas.

All of our properties have been broadly classified for oil possibilities by DeGolyer and MacNaughton of Dallas, Texas. This outstanding firm of geologists have selected from our total holdings certain properties, comprising more than 50,000 acres, as immediately suitable for oil and gas prospecting.

We invite inquiry from responsible drillers. We also have considerable acreage which we will consider leasing. Address P. O. Box 177, Cincinnati, Ohio.

Classified Advertising

SITUATIONS WANTED

CORPORATION LAWYER, middle age. 20 years experience in Legal Departments of major and independent companies. Thoroughly familiar with oil and gas law and titles in the Mid-Continent States. Now employed eight years in Legal Department of major company. Desires change solely for personal reasons. Over draft age, in good health, married, one child. Available after reasonable notice. Would require salary around $6,000. Box C-168, The Oil and Gas Journal, Tulsa, Okla.

GRADUATE Geologist, recently graduated from Lafayette College, Easton, Pa., no field experience, but willing to work hard and go anywhere in continental N. A. In perfect health, age 26, and draft deferred Can furnish a certificate of availability and excellent references. Richard W. Harding, River Road, Yardley, Pa.

FOR oil drilling locating we use the Multiple Gravitation Insulation Geology Block System. A positive method. We can locate oil pools from airplane. Draper & Co., Seymour, Iowa, Route 1.

TAX expert desires change. College education, age 30, certificate available. 18 years experience, 10 years with present employer, major oil company. Would leave Tulsa. Box C-173, The Oil and Gas Journal, Tulsa, Okla.

YOUNG MAN, 35, married, 2 children University trained, over fifteen years experience in natural gasoline and recycling plant operations, desires situation with progressive organization. Has had broad experience in laboratory, close fractionation, plant operation, plant control, process design, construction, and organization work. Has working command of Spanish, both written and spoken. At present is superintendent in charge of one of the larger plants in the southwest. Certificate of availability can be obtained upon reasonable notice to present employers. Box C-175, The Oil and Gas Journal, Tulsa, Okla.

NEED new blood in your refinery? Have 18 years experience in general refinery work, primarily cracking. Last seven years in supervisory position. Now employed. Would like to contact growing independent with good postwar opportunities. Box C-174. The Oil and Gas Journal, Tulsa. Okla

SEISMOGRAPH COMPUTER: 6 years geophysical experience, including 3 years computing. B.S. Degree. Military classification 3-A. Leaving present employ March 15th for personal reasons. Would be available for future foreign work. Box C-187, The Oil and Gas Journal, Tulsa, Okla.

PRODUCTION MAN: Cable tool and rotary drilling experience 22 years. Age 42. Available April 1st. Box C-181, The Oil and Gas Journal, Tulsa, Okla.

HELP WANTED

WANTED: Refinery superintendent. Give details of your capabilities and experience, also references. Willing to pay attractive salary to secure high-class, capable, and reliable man. Correspondence confidential. Address Box C-196, The Oil and Gas Journal. Tulsa, Okla.

EMPLOYMENT OPPORTUNITIES FOR FOREIGN SERVICE

The Arabian American Oil is interested in receiving applications from technically educated men, and/or men with oil field experience, for work in Saudi Arabia. This offers a splendid opportunity for advancement and postwar security, with good working conditions hospital and medical care, liberal benefit plans, and vacation privileges in the United States.

Write or apply to our Relations Department

ARABIAN AMERICAN OIL CO.
200 Bush Street
San Francisco 4, California

HELP WANTED

CHEMICAL ENGINEERS with experience in any of the following petroleum refining operations (1) light ends recovery equipment, absorbers, stabilizers, etc. (2) catalytic cracking equipment or (3) crude distillation equipment and similar processing units. State in detail educational background, positions held with detailed explanation of work handled, age, and number dependents also draft status. Box C-165. The Oil and Gas Journal, Tulsa. Okla.

WANTED: Combination Dubbs Topping Plant operators; Combination power plant boiler operators; Pumpers; Still helpers, combination topping and cracking; Refinery Pump Mechanic, and refinery machinist. Location, inland Texas independent refinery. Box C-155, The Oil and Gas Journal, Tulsa, Okla.

OIL REFINERY
INSTRUMENT ENGINEER

Who is thoroughly experienced on selecting and specifying instruments.

FURNACE DESIGNER

experienced on oil refinery work.

5½-day week with time and one-half for work in excess of 40 hours per week. Apply at once, giving complete details including hourly rate desired. Statement of Availability required.

ARTHUR G. McKEE & COMPANY
2300 Chester Avenue
Cleveland, Ohio

WANTED, by a leading steel manufacturer; experienced field engineer for oil country tubular goods work; also want experienced man for sales and sales engineering work on seamless and welded mechanical and pressure tubing; Attractive opportunities. Write in full to Box C-160, The Oil and Gas Journal, Tulsa, Okla.

MECHANICAL ENGINEER: Experienced in centrifugal pump designing. Manufacturer of centrifugal pumps located in Central Indiana. Now doing essential war work but making plans for postwar which includes redesigning entire line. Company has 40 years reputation and bright future. Good opportunity for man with experience in this line. Give full information. Strictly confidential. Box C-180, The Oil and Gas Journal, Tulsa, Okla.

Wanted by Major Pipe Line Company
CIVIL ENGINEER, an excellent opening for an engineer capable of doing part-time drafting in headquarters office and survey work in the field. MECHANICAL ENGINEER, a permanent position as supervisor of mechanical maintenance and installation. Pipe-line experience required. Headquarters Tulsa. State qualification, draft status, age, and salary desired. Box C-122, The Oil and Gas Journal, Tulsa, Okla.

PRODUCTION CONTROL ENGINEER Experienced in machine and welding shop, planning and routing jobs. Progressive Eastern manufacturer of heat exchange equipment and pressure vessels offers opportunity in war and postwar work. Write complete experience, current and former employers, salaries. Box C-182, The Oil and Gas Journal, Tulsa, Okla.

PIPE-LINE PUMP STATION ENGINEERS Familiar with diesel type engines, for work in Oklahoma. 48-hour week. Major oil pipeline company. State qualifications, draft status, age, and salary desired. Box C-123, The Oil and Gas Journal, Tulsa, Okla.

OIL field service company has position open for field sales and service man in Louisiana Gulf Coast area. Applicant must have good knowledge of and be well acquainted in oil well drilling industry and be preferably draft exempt. Attractive salary. Expenses and car furnished. Box C-195, The Oil and Gas Journal, Tulsa, Okla.

HELP WANTED

PETROLEUM Engineering Graduate with oil-field production experience, by established secondary-recovery consulting firm. Reply by letter, giving education, complete oil-field experience, draft status, snapshot and salary expected. Box C-194, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Chemist for laboratory, familiar with manufacture of white oils, petroleum sulfonates and related products, by old established company; chance for advancement. State age, experience, education, salary and draft status. Box C-191, The Oil and Gas Journal, Tulsa, Okla.

REFINERY SUPERINTENDENT
Experienced in both operations and maintenance. Graduate engineer 35 to 50 years of age who has a good record as a practical operating man, administrator and handler of men. Successful independent oil company with completely integrated operations located in Ohio valley. Reply Box C-186, The Oil and Gas Journal, Tulsa, Okla.

PATENT ATTORNEYS

PATENTS, Trade-Marks, Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

MONEY RAISING

FINANCIAL BACKING WANTED
Have preliminary information on several wildcat blocks of leases in Texas and Louisiana. Some with favorable geology available. Blocks would have to be leased and geology checked or rechecked. Have had long experience and desire financial backing to carry on a wildcat program. Will expect salary, expenses and carried interest. Box C-190, The Oil and Gas Journal, Tulsa, Okla.

CRUDE-OIL PRICES

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.28
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

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Journalisms:

THE Journal makes its second contribution to the conservation of paper effective with next week's issue but in such a manner that only the margins will suffer. It would have been much simpler from a mechanical viewpoint to have saved the paper by taking it out of the readers' hide. (That we must see—taking paper out of hide—still anything can happen in these days of manufacturing miracles and synthetic marvels.) One of our brain trusters, hitting upon the idea that the readers seldom use the margins except for penciling caustic notes to the editors, suggested that we trim off the fat. Type page size remains unchanged, 7 by 10 in.; trim size of the complete book becomes 8⅛ by 11¼ in., a reduction of ⅜ in. in depth and ⅝ in. for width. Advertisers' bleed plates should be made 8¼ by 11½ in. overall, including base. The readers can continue looking for their same favorite features in the same relative locations and in the same quantity. Before the war had hardly more than started, the Journal cut from the old size of 13½ by 10¼ in. to the dimensions of 8¾ by 11⅝ maintained through this issue.

IMPROVED technique and better knowledge of conditions have combined to bring about a reduction of 25 per cent in the time required to drill wells in the West Edmond field in northwestern Oklahoma County and northeastern Canadian County, Oklahoma. An average time of 30 days is now required, whereas earlier wells took about 40 days to drill. Factors contributing to faster completion are discussed in an article that will appear next week. The author is E. G. Dahlgren, technical secretary of the research and coordinating committee of the Interstate Oil Compact Commission.

THE recently completed cycling plant of Distillate Production Corp. in the North Houston-Fairbanks area, Harris County, Texas, is one of the industry's answers to the wartime demand for increased recovery of gas-condensate constituents. The plant has among the highest recoveries of butane of any cycling plant in operation. It was anticipated that a yield of 85 per cent would be obtained, but recent tests have indicated that the recovery will be even higher. An article describing the plant, which incorporates some unique and interesting features, will appear in next week's Engineering and Operating Section.

CALENDAR

March

A.A.P.G., S.E.G., and S.E.P.M., annual meeting, Dallas, Tex., March 21-23.

W.P.R.A., thirty-second annual meeting, Jefferson Hotel, St. Louis, Mo., March 28.

A.P.I., Pacific Coast District, Division of Production, Biltmore Hotel, Los Angeles, Calif., March 23.

A.G.A., war conference on industrial and commercial gas, Hotel Seneca, Rochester, N. Y., March 30-31.

April

INTERSTATE OIL COMPACT COMMISSION, quarterly meeting, Roosevelt Hotel, New Orleans, La., April 3 and 4.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, annual meeting, Rice Hotel, Houston, Tex., April 10, 11 and 12.

N.G.A.A., annual meeting, Baker Hotel, Dallas, Tex., April 12-14.

A.P.I., PRODUCTION DIVISION, eastern district, Dashler-Wallick Hotel, Columbus, Ohio, April 13-14.

N.P.A., semiannual meeting, Hotel Cleveland, Cleveland, Ohio, April 20-21.

SEVENTH ANNUAL MIDWEST POWER CONFERENCE, Palmer House, Chicago, April 13-14.

NATIONAL OIL SCOUTS AND LANDMEN'S ASSOCIATION, annual meeting, Dallas, Tex., April 24-25.

I.P.A.A. AND NATIONAL STRIPPER WELL ASSOCIATION, midyear directors' meeting, Bradford, Pa., April 27, 28 and 29.

May

A.I.M.E., Gulf Coast Section, annual meeting, Houston, Tex., May 8-10.

NATIONAL OIL AND GAS POWER CONFERENCE, sponsored by A.S.M.E., Tulsa, May 8-10.

A.G.A., NATURAL GAS DEPARTMENT, spring conference, French Lick Springs Hotel, French Lick, Ind., May 11-13.

A.P.I., Mid-Continent Section, Production Division, Mayo Hotel, Tulsa, May 25-26.

June

A.S.T.M., forty-seventh annual meeting, Waldorf-Astoria Hotel, New York, June 26-30.

November

A.P.I., annual meeting, Stevens Hotel, Chicago, November 13-16.